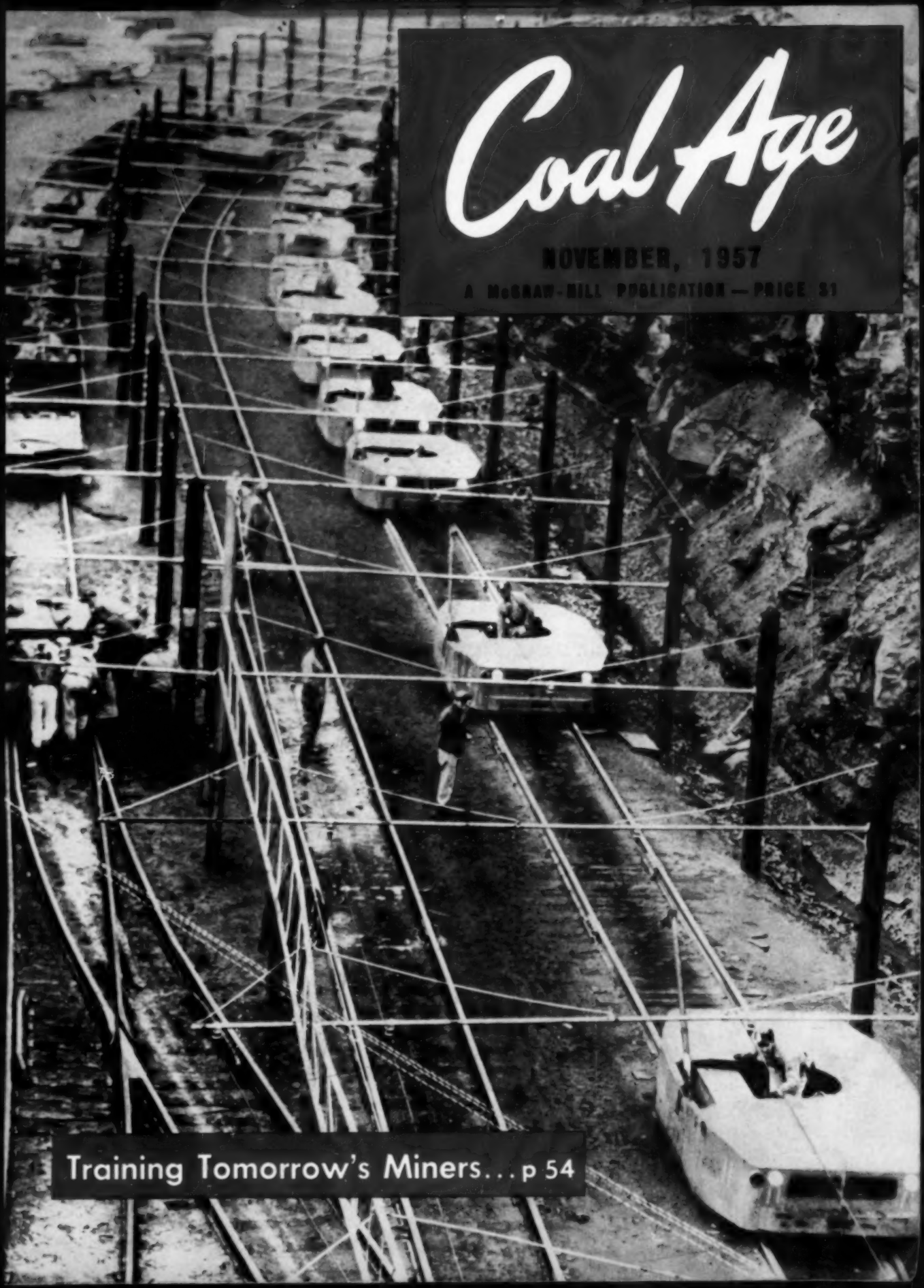

Coal Age

NOVEMBER, 1957

A McGRAW-HILL PUBLICATION — PRICE $1

Training Tomorrow's Miners... p 54

These M-S-A® instruments help you guard against

METHANE

M-S-A METHANE DETECTOR TYPE W-8

Accurate, portable instrument for measuring methane content of mine air at working face, break-throughs, air courses, and other points in mine where methane may accumulate. Operator squeezes rubber hand-bulb a few times, draws in air sample, and amount of methane is indicated on easy-to-read dial in less than 30 seconds. Two scale ranges—for greater reading accuracy—0 to 2% and 0 to 5%. U.S. Bureau of Mines Approved. Write for bulletin.

M-S-A METHANE TESTER TYPE M-6

New, small, streamlined instrument indicates methane concentrations as low as .2% in mine air. Pump is operated with the thumb while tester is held in palm of the hand. Edison Electric Cap Lamp battery provides dependable power. Unit conveniently connects and disconnects with battery. U.S. Bureau of Mines Approved. Write for bulletin.

M-S-A WOLF JUNIOR FLAME SAFETY LAMP

Light-weight aluminum construction and small size make inspection easier. This feature, combined with the easy-to-read standard size graduated chimney, assures utmost dependability in testing for methane and oxygen deficiency. Write for bulletin.

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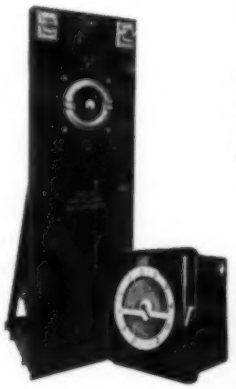

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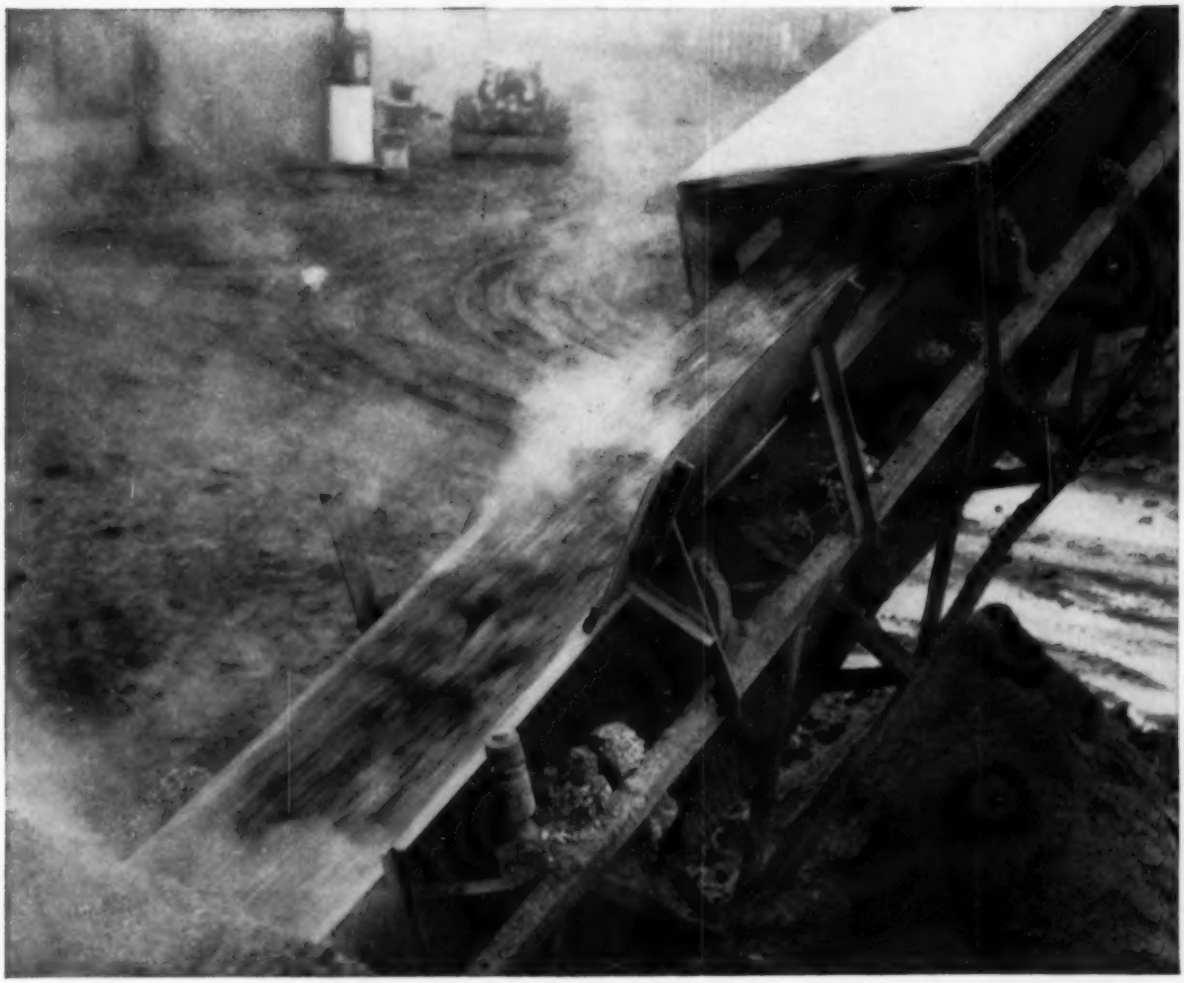
B.F.Goodrich report:



Now they burn coal refuse to make lighter building blocks

B. F. Goodrich improvements in rubber brought extra savings

Problem: Those steaming hot cinders on that conveyor belt are burned coal refuse. Once thrown away as useless, the refuse is now used to make an improved, lightweight building block.

After cooking at a white hot 2500 degrees, the cinders are sprayed with water, but are still plenty hot when they're dumped on the conveyor belt to be carried to storage. This heat, plus the wear and tear from sharp, jagged cinder edges, ruined a belt made of asbestos in only 30 days.

What was done: When a B.F.Goodrich distributor heard of the problem, he recommended a B.F.Goodrich belt that's made to carry such hot materials as coke, hot sand, lime. This belt is made with a special heat-resisting rubber that can stand temperatures that would char or burn ordinary rubber belts.

Savings: The B.F.Goodrich belt was put to work and lasted 20 months—far longer than the asbestos belt it replaced. The belt worked around the clock, 7 days a week, carrying 120 tons of hot cinders a day. There was not one shutdown for maintenance or repairs.

Where to buy: Your B.F.Goodrich distributor has the exact specifications on the belt that solved the problem in this plant. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-205, Akron 18, O.*

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A REALITY...

★*better lubrication!*
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The leading supplier of lubricants for the Coal Mining Industry is...

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QUALITY LUBRICANTS
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Oil & Grease Company

Here's a better *RUN* for your money

The BIRD-HUMBOLDT
SCREEN CENTRIFUGE
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Ask us to mail you a copy of the Bird-Humboldt Bulletin telling how and why *this* Screen Centrifuge gives you a *better run for your money*

BIRD-HUMBOLDT *Screen Centrifugal Dryer*

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This Month in Coal Age

NOVEMBER 1957

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Deep Stripping Overseas ..... p 74
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►Management Planning

Training Tomorrow's Personnel—Today . p 54

W. A. Raleigh, Jr., Assistant Editor Coal Age

On Aug. 21, 1956, an historic meeting was held in the offices of the Pocahontas Operators Association, Bluefield, W. Va. The meeting was historic because some 40 organizations—representing coal producers, related industries, schools and colleges—met to draft a workable plan for coping with future technical manpower needs in the five-county area surrounding Bluefield. A plan took shape in the formation of the Pocahontas Industrial Council for Education. Possibly setting a pattern for industry-wide action, the plan is wrapped around five lines of activity—public relations; science fairs; engineer speakers and advisors; school curricula, teacher and guidance problems; and vocational schools. In a little more than a year of operation, plans have been translated into a workable program which has infused the entire Pocahontas community with enthusiasm that will not stop short of successful achievement.

Featured—Photos of science fair winners; the McDowell County Vocational School; the Pocahontas training forum; organizations and men behind the program.

►Mine Reconstruction

How Koehler Is Rebuilding for Continuous Mining ..... p 60

W. K. Dennison Jr., Superintendent, Koehler mine, Kaiser Steel Corp., Raton N. M.

Widening of 7 mi of existing main-line and secondary entry to accommodate new-type continuous miners, 15-ton cars and modern locomotives is one of the major steps in rebuilding Koehler mine to help supply the coking coal needs of the Kaiser steel plant. Process consists of brushing and bolting original opening to a minimum height of 6½ ft, then using continuous miner to increase width to 14 ft, following this by final bolting. Miner first takes coal and then rips down top rock, which is loaded separately into cars by pickup unit. Average advance per shift is 75 ft.

Added Attractions—Use of surplus landing mats with roof bolts and reclaimed narrow-gage ties for laying the new track; relocation of the washing plant and surface facilities.

►Equipment Inspection (Part II)

Inspection Guide for Deep Mine Equipment ..... p 64

Daniel Jackson, Jr., Assistant Editor, Coal Age

Frequent inspections, and good reports and records

(Continued on p 7)

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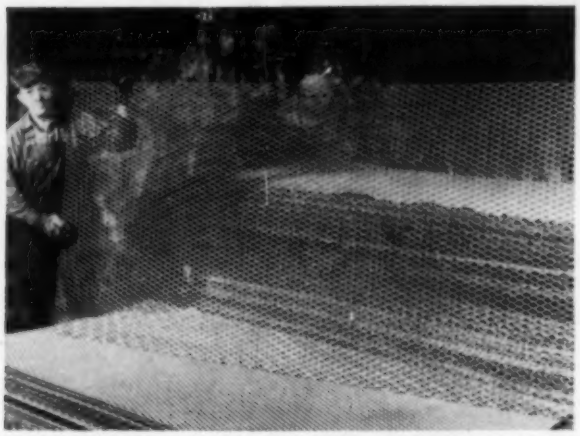
For maintenance steels...call Ryerson

COLD FINISHED SHAFTING—Ryerson stocks of turned, ground and polished bars (C-1025, C-1045 and C-1141) provide a ready source for shafting of outstanding size accuracy, straightness and concentricity. For greater strength use Ryerson heat-treated Rycrome, a medium carbon alloy.



EXPANDED METAL—Furnished in two basic types, standard and flattened, Ryex expanded metal is light yet strong and rigid—easy to handle because sharp edges have been removed. Use it for enclosures, machine guards, grilles, shelves, bins, etc. Also available: Ryex expanded metal grating.

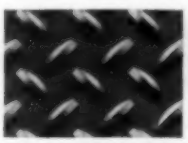
GALVANIZED SHEETS—Tight-coated galvanized that forms without flaking is available in a wide range of gauges and sizes. Sheets take paint or lacquer readily without "weathering." And for roofing, siding, etc., they can be furnished with standard corrugation or attractive new mansard corrugation.

STAINLESS PIPE & TUBING and fittings as well, are on hand in a complete range of types—304, 316 and 304-L for welding applications involving severe corrosion, and in a full range of sizes including schedules 5, 10, 40 and 80. Valves and welding and screwed type fittings also available.

Every kind...quick shipment

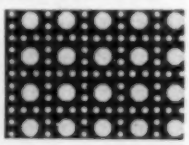
Whether you're up against an emergency or a routine need for steel, call Ryerson. You'll get what you want when you want it.

Steel of every kind and shape and size is available at Ryerson, from the world's largest stocks. It's ready for shipment fast—selected, checked and dispatched by an organization with over 115 years of metal distribution experience. And Ryerson is ready to help with steel selection, application suggestions, and scheduling. Ryerson steel and Ryerson service are as near to you as your telephone.



SAFETY PLATE—Tough, rolled steel plate with the Inland 4-WAY safety pattern is available in two pattern sizes for industrial flooring, stairs, ramps, platforms.

WELDED GRATING for strong, durable open steel flooring is available from Ryerson with all necessary cut-outs and banding. Comes painted or galvanized.



PERFORATED SHEETS for immediate shipment in standard patterns. Other patterns perforated to order from carbon steel and stainless sheets and plates.

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

are the foundation of any maintenance system. Face equipment varies widely in types of work performed. The electrical, mechanical, hydraulic and lubrication principles essential in the design of face equipment are similar. These principles are discussed in detail in part two of this three-part inspection guide.

Sidelights—Inspection and report forms illustrate good maintenance practices.

► Pumping

Automatic Refuse Pumping ..... p 72

Red Parrot Coal Co., Prenter, W. Va., faced the problem of disposing of waste slurry from the washery in an area where trucking the solids away is not feasible. Solution to the problem was the installation of a variable-speed pumping system in which the output of the pumps is automatically changed to suit the duty required.

Feature—Line drawing of automatic v. manual control schemes.

► Stripping

Deep Stripping Overseas ..... p 74

Acorn Bank, near Newcastle, England, is a major open-pit operation in which 230 ft of overburden is removed to expose the coal. Power shovels and trucks remove the top 90 ft of cover, and 25-yd draglines, working from the bench 140 ft above the coal, remove the remainder. Coal is hoisted out of the deep pit by derricks which also are installed on the 140-ft level. Drills produce 14,000 ft of 6-in blasthole each week at this large-scale project.

Sidelight—Vital statistics on Acorn Bank project.

► Hydraulic Mining

Vertical-Seam Mining by Jet Cutting, Fluming and Pumping ..... p 80

To solve safety and other problems connected with mining vertical Gilsonite veins, American Gilsonite Co. went to all-hydraulic mining. Twin-jet mining units use water to cut material out of the solid and start it through ditch and flume system to crushing plant at bottom of main shaft, followed by pumping to the surface and pipelining 72 mi to processing plant. Mining is done by driving 12-ft-high lifts between shafts 1,000 ft apart, working from the surface down. Expected jet-car output, with two operators, is 330 tons per shift at the Gilsonite mine.

And in Addition—Flooring and bolting to protect

(*Continued on p* 11)

This Month in Coal

CAUTIOUS OPTIMISM—October found bituminous still largely marking time in the production game, though still set for possible gains in the remaining months. The total of such gains was the subject of some debate. The NCA Committee on Coal Economics and Statistics put them at 700,000 tons. At least a few others were willing to go higher—up to 2 or 3 million tons—in view of the signs of a comeback in general business, including the bellwether, steel. A forward movement, instead of the crabwise progression characterizing most of 1957, would make a significant difference in the final total. The expectation of such a forward movement is justification for an attitude of "cautious optimism" for 1958.

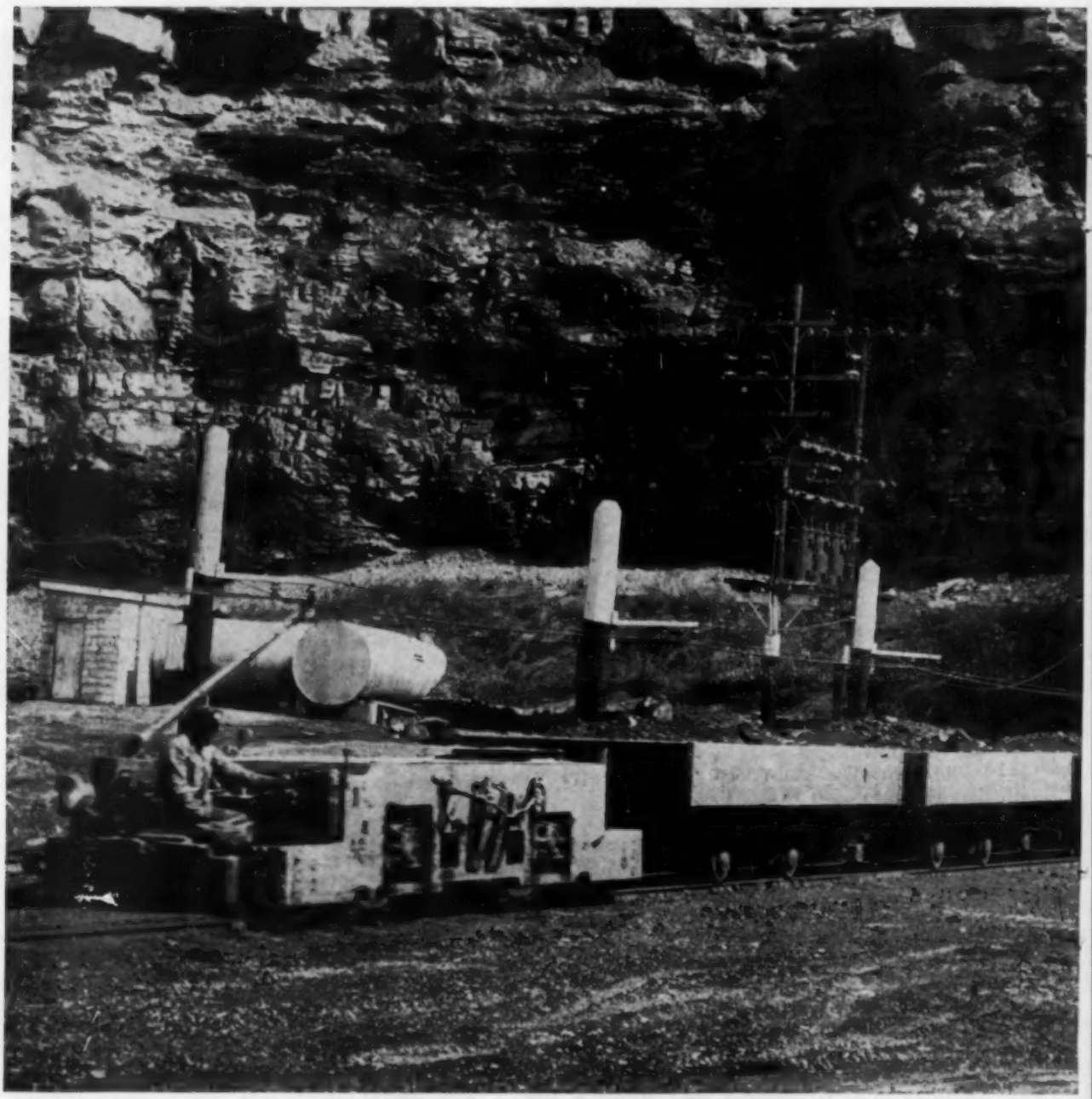
ANTHRACITE TOO—The end of September brought a little break from the weather for anthracite and October was about normal, leaving November and December to tell the tale as far as reaching the 1956 output is concerned. But even if it doesn't hit 1956, anthracite will fare better than the retail segment of the bituminous industry, which will end 1957 off over 9 million tons, or nearly 25%. The anthracite staying power, forecast in this column and elsewhere in Coal Age, continues to deserve the label of "remarkable." So, "cautious optimism" applies to anthracite in 1958, as well as to bituminous.

HIGHER OIL TIDE?—Sales of petroleum products advanced only slightly in 1957—so slightly that many segments of the industry consider the situation almost a loss of ground. In a sense it might be. People apparently have not burned gasoline or other fuels at as prodigal a rate in 1957, and the results have included rising stocks of products in storage tanks, less-than-expected crude runs to refineries and, in the United States, some cuts in prices paid to crude producers by refining companies.

In the absence of a significant rise in gasoline use, all this could mean, among other things, a renewed drive on the home-heating and heavy fuel markets sparked by substantial price concessions. Some help might be afforded coal if the administration succeeds in warding off the collapse of voluntary import restrictions, or if it goes to a mandatory system without undue delay. But the possibility of stiffer oil competition cannot be ruled out for the immediate future, which is another reason for "caution" in optimism.

MORE SQUEEZE?—The times when coal hasn't been feeling price pressure have been most infrequent and well spaced out. Now, coal producers have a lot of bedfellows from among the ranks of manufacturing and other industries that up until recently have had little difficulty getting their prices no matter how fast they have been driven up. Presently they are complaining a little and are inclined to look a little harder at the price tags on the things they buy. These of course include fuel. A rebound in the business index would help materially. In the meantime, however, coal may experience an increase in price pressure. Properly met, it should cause no difficulty.

EASIER STARTS and



TEXACO

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GREATER SAVINGS

Even at winter temperatures, trains start more easily when car wheels are lubricated with

Texaco Olympian Grease.

Maintenance costs are lower, too.

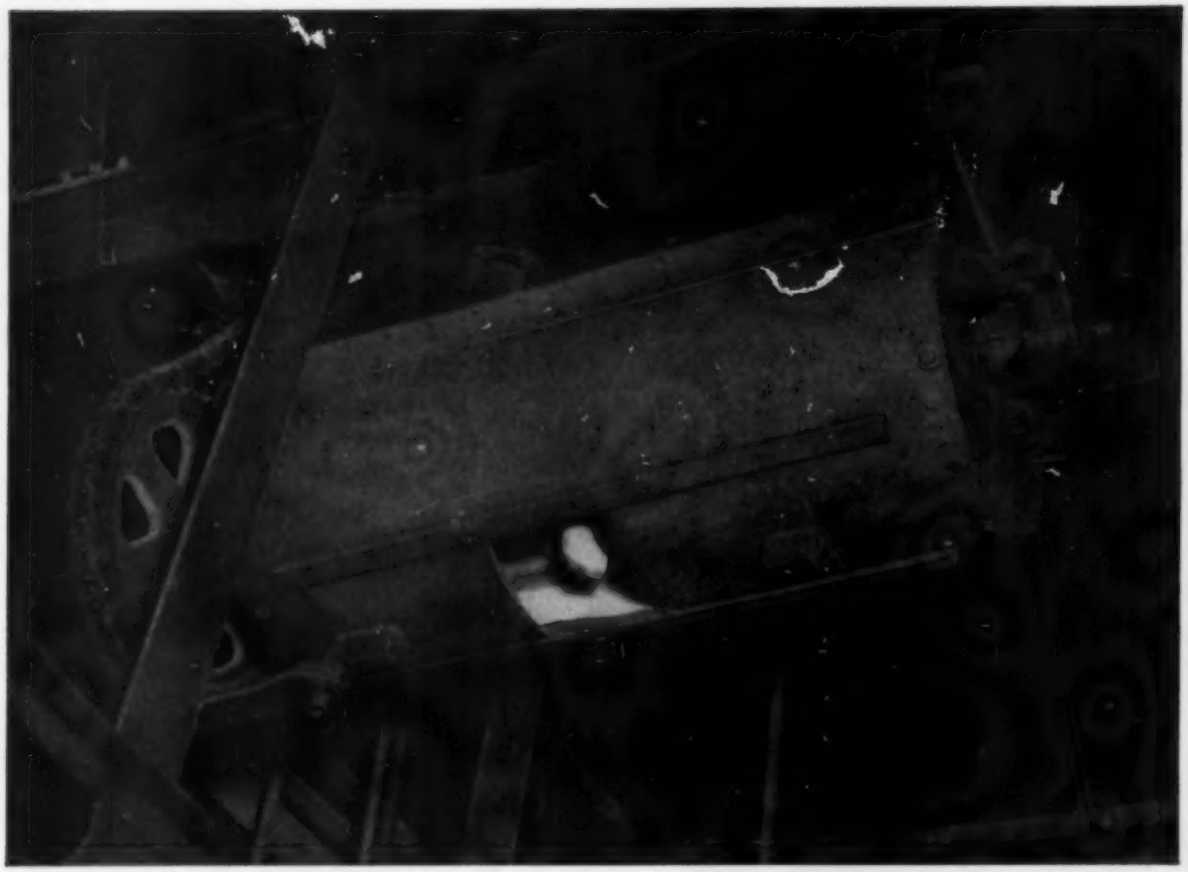
TEXACO OLYMPIAN GREASE—equally effective in plain, cavity hub or anti-friction bearings—has high resistance to oxidation, does not separate in service or in storage, and *stays in* the bearings. You can count on long lasting protection, long life for bearings.

For your high speed anti-friction bearings—as in locomotives, cutters and other equipment—use *Texaco Multifak*. This is a multi-purpose grease that resists oxidation and guards against rusting. And because the one grease does many jobs, *Texaco Multifak* simplifies lubrication, reduces errors and lowers costs.

Let a Texaco Lubrication Engineer give you the benefit of his broad experience in the selection of the proper lubricants for your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry



LOCK JOINT PIPE COMPANY of NEWINGTON, CONN., REPORTS:

6 times longer service life with JALLOY steel plate

Mild steel plate at bottom of this cement agitator had to be replaced every 4 weeks. The ¼" Jalloy plate, now used, lasts from 22 to 24 weeks. The Lock Joint Pipe Company has a resultant saving in reduced downtime and steel cost.

Heat treated Jalloy steel will also extend the life of your products that are subjected to rigorous impact and abrasive conditions. Increased product life can reduce your downtime and maintenance costs. Jalloy is available in forms you require (hot rolled sheets, plates, bars, small shapes and structurals). It can be purchased in three different grades to meet requirements of formability, hardness and wear resistance.

Your local distributor can supply you with details on Jalloy grades, or you can write to Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

This Jalloy plate is formed cold into a half circle 14 inches across the open end. Length of the agitator bottom plate is 30 inches. Dick Griffith, superintendent at the Newington, Conn., plant, reports that Jalloy steel plate stands up under the tough abrasive action of the cement dry mix and the pounding of the 16 agitator teeth. Material for this installation is supplied by Brown-Wales Co., Cambridge, Mass.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

This Month in Coal Age

CONTINUED

against sloughing of walls; water volume and pressure required for mining.

► Stream Protection

How Y & O Controls Stream Pollution . . . p 84

Youghiogheny and Ohio Coal Co. built an impounding reservoir on top of their slate banks to receive the effluent from their preparation plant. Solids settle out in these basins. The filtrate leaving the banks and entering the natural drainage system meets the requirements of the West Virginia Water Control Commission. The system features minimum cost and simplicity of design.

Sidelights—Photos illustrate the effectiveness of the system.

Editorials . . . . . p 53

Better merchandising especially needed in 1958—Future outlook for oil imports—Capacity increases and their implications.

The Coal Commentator . . . . . p 12

Not by ear—Staying power—Unfallselbstschutz—Fully earned—for you.

Foremen's Forum . . . . . p 88

November cornucopia.

Operating Ideas . . . . . p 92

Preplanning improves feeder-trolley installation—Cascade unit improves laboratory sieving—Tweezers From Hacksaw Blade—How to make good braze welds.

Equipment News . . . . . p 96

Truckmounted blasthole drills and V-belt fasteners are the large and small of this month's equipment developments. In between are a side-dumping front-end loader, a vehicular desk, a silent electric bin vibrator and full fare of other items.

News Roundup . . . . . p 110

Dissatisfied with revenue and business losses, Britain may reduce United States coal imports; Glen Alden Corp. welcomes offer by List Industries to buy 700,000 shares of outstanding stock; tension over an Atomic Energy Commission contract to provide coal for Hanford Works power plant in Washington continues among coal companies of four states.

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The Coal Commentator

Not by Ear

How many mine operating men know what a given crew with a given machine under a given set of conditions should produce per shift? Answer: A lot more now than used to, and if the rise in the employment of industrial engineers, standards engineers and time-study men continues—as it will—a lot more will be knowing in the relatively near future.

In fact, as is being increasingly pointed out, it is imperative to know in these days of high costs for labor, for equipment and for materials. Playing by ear may get the right results, but again it may not. If the wage bill for a unit is $228, and the unit gets only 300 tons a shift when it should get 340, the labor cost is increased from 67 to 76c per ton. The loss in income to the mine, with the selling price the same in both instances, is around $7,000 a year multiplied by the number of units in service.

Standards developed by analyzing and time-studying at least the major phases of the operation provide, simply and effectively, the controls needed to assure the minimum in production cost.

Staying Power

One way or another, coal is showing that it means to stay in the running as the chief source of energy for home comfort.

Example I—A recent issue of *West Penn News*, featured four of its employees homes designed for heating with electricity, bringing the total in West Penn territory to 68. Calculated costs of heating the four latest—coal supplies the juice—range from $260 a year (1,400 sq ft of area) to $330 (1,700 sq ft).

Example II—The *Dodson Weekly Bulletin* recently noted that there are 3,000,000 hand-firing users of anthracite, and that 15,000 new hand-fired units were installed in anthracite territory in 1956—an increase of 25% over 1955.

Example III—The *NCA Industry Bulletin* reports that Henry C. Woods, chairman of the Sahara Coal Co., recently presented Mrs. David Briggs, of Bloomington, Ill., with a hand-decorated certificate entitling her to a year's free supply of Sahara coal. Reason? Her 50th anniversary as a consumer of Sahara coal.

To repeat, evidence such as this is more reason for continuing to maintain that coal's future as the source of home comfort is promising.

Unfallselbstschutz

"Accident self-protection" is the free translation of this tongue-twister from Germany. It has been coined by the men of Dortmunder Bergbau, AG, employing 32,000 colliery workers, as a convenient means of expressing the principle of personal responsibility plus official responsibility for the promotion of safety.

Under *unfallselbstschutz* it is the duty of all men to accept personal responsibility for the prevention of accidents, and of management to provide help and training. Supervisory responsibility is emphasized, and working committees permit bringing the ideas of all to bear.

Since the adoption of the program the Dortmunder accident rate has dropped to half that of the Ruhr field and further gains are expected—additional evidence that acceptance of responsibility, proper organization, and training in prevention can bring the accident toll down to bedrock.

Fully Earned

It is literally true, in spite of the glamor surrounding the newer additions to the fuel ranks, that the United States could not have reached its present position without coal—nor could it maintain that position and continue to grow without it in the future. In other words, the job it has done and will continue to do definitely entitles it to at least a few honors.

One such honor possibility is a commemorative postage stamp or stamps. The Northeastern Pennsylvania Philatelic Society has originated the latest of such requests—for a stamp marking the anthracite industry's sesquicentennial Feb. 11, 1958. **Any way you look at it, anthracite has earned a stamp—and so has bituminous.**

For You

When you go through this issue of *Coal Age* you will notice that in addition to the different "display material"—printerese for heads, captions and the like—that greeted you in September, something more has been added. Now, there is more space between these lines you are reading or, again in printerese, more lead. The aim is easier reading for you.

What is said by that type, that display material and the illustrative matter that round it out remains, however, the most important thing of all. It is the focus of editorial attention, and the objective of a lot of sweat over clear, easy-flowing writing and well-organized and presented illustrations. But when the best in material, writing and presentation has been achieved, the end product should be as easy to read as is economically possible. With that in mind, we offer for your better reading the new *Coal Age* typography.

CENTRAL OHIO COAL CO. ADDS FOURTH 50-R

Repeat Orders Follow Fine Performance of Bucyrus-Erie Rotary Blast Hole Drill

Early in 1955 the Central Ohio Coal Co. put a Bucyrus-Erie 50-R rotary blast hole drill into operation at its mine near Zanesville. The output of this drill was watched carefully, and a decision was soon reached: footage records called for conversion to 50-Rs at an early date. Accordingly, three more of these Bucyrus-Eries were subsequently added.

In pit after pit the story is the same — those who buy Bucyrus-Erie rotaries soon want to switch over exclusively to these moneymakers. Among the reasons for this preference are the following:

★ *Maximum controlled penetration* through hydraulically powered down pressure on the bit.

★ *Most efficient drilling speed* for a given formation because of Ward Leonard electric control on rotation of the drill stem.

★ *Continuous drilling of hole* for the full length of the drill pipe — 32 ft. 9 in. on the 50-R; 27 ft. 9 in. on the 40-R.

★ *Elimination of manual effort* when adding or removing drill pipe, made possible by remote-controlled, power-driven drill pipe rack.

★ *Air cooling of the bit* by compressed air.

★ *Efficient removal of cuttings* —fine cuttings are picked up and handled by a Roto-Clone precipitator; heavies pile up adjacent to the drill hole for use as stemming material.

Bucyrus-Erie rotaries are available in two sizes — the 40-R (equipped with either diesel-electric or full electric power) for drilling 6¾- to 9-in. holes, and the 50-R (electric only) for drilling 9⅞- to 12¼-in. holes. For detailed, illustrated literature, write today.

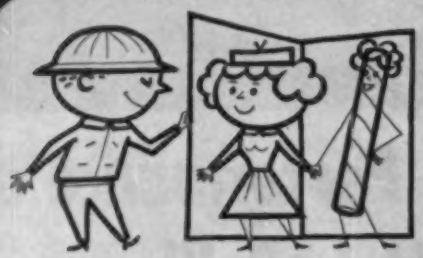
61857 C

BUCYRUS ERIE

South Milwaukee, Wisconsin

HERE'S A MOVIE FOR POWDER MEN ONLY

"How to handle WOMEN and EXPLOSIVES"



TREAT THEM GENTLY AND WITH RESPECT

PROTECT THEM FROM UNAUTHORIZED PERSONS

OBEY THE DO'S AND DON'TS

to help you blast with greater safety

You'll protect your safety record and gain a smoother, safer blasting operation if you use the new Atlas movie "*How to Handle Women and Explosives*" to help your men observe basic safe practices in their work.

You'll make a deep impression at your next safety meeting with this film which is calculated to bring out amused chuckles and possibly a few guffaws. At the same time it stresses the fact that both women and explosives must be "handled with care" and that both have a list of Do's and Don'ts which must be observed in order to get along with them safely.

Many large operations are using "*How to Handle Women and Explosives*" as a safety meeting kick-off and following with a discussion of the Do's and Don'ts case insert.

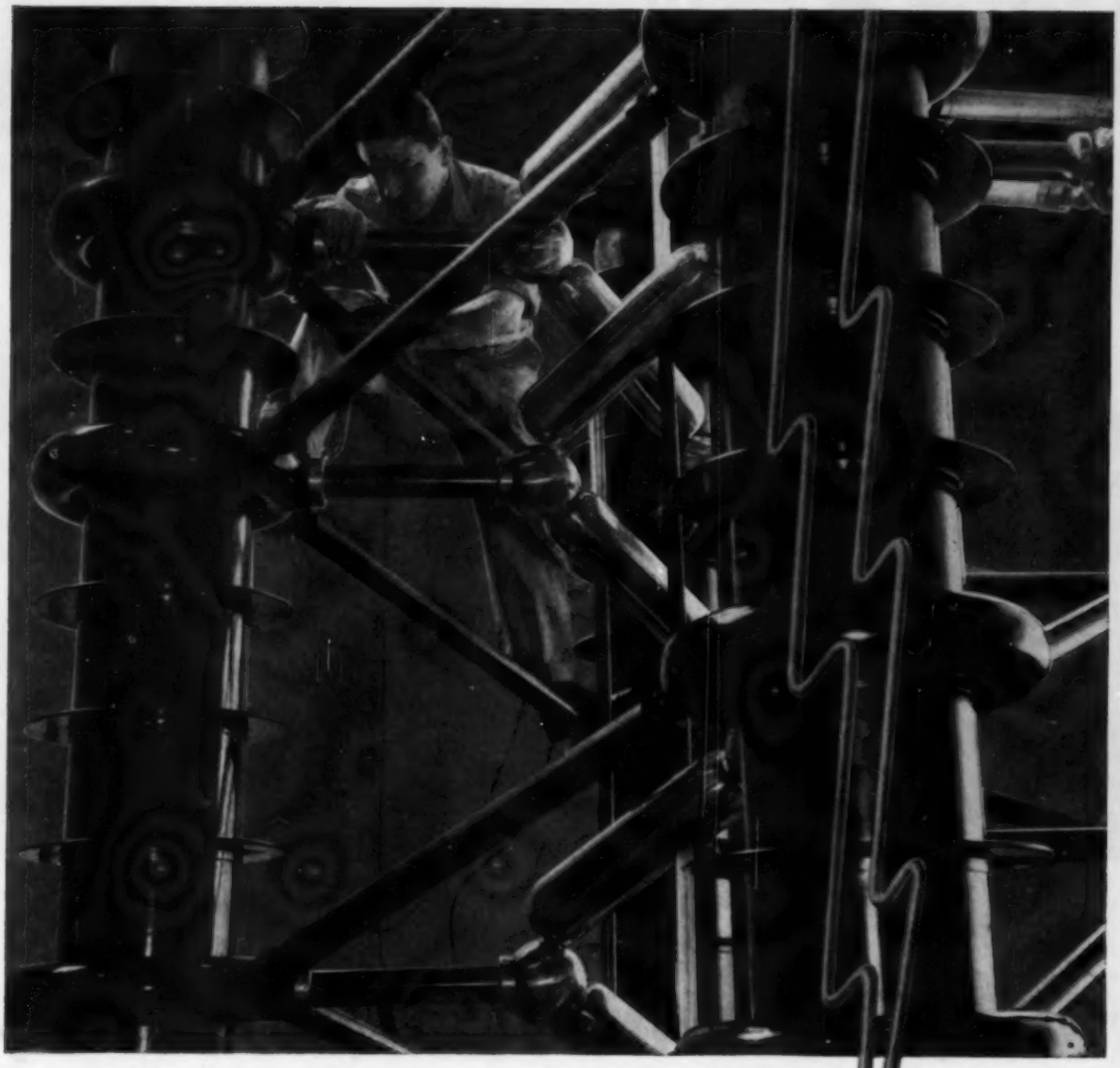
The film, complete with a suggested program kit and enough copies of the Do's and Don'ts for your audience, will be sent to you without cost if you write us on your company letterhead, giving the date or dates you plan to use it.

EXPLOSIVES DIVISION

ATLAS POWDER COMPANY

WILMINGTON 99, DELAWARE

offices in principal cities



Simplex Wire & Cable Company's new 1,400,000 volt impulse generator — the first of its kind to be installed in North America — represents just one aspect of research at Simplex. Simplex scientists and engineers originated the process of vulcanizing portable rubber cords and cables in a lead mold. Simplex developed the first heavy-duty portable electrical cable — Simplex TIREX. The first truly moisture-resistant rubber insulation was the outcome of a commercially acceptable method of deproteinization developed by Simplex. Simplex designed the first interlocked armored cable for underground service — Simplex CONDEX. And now — Simplex C-L-X — the portable, corrugated metallic duct WITH SEALED-IN CABLE. **SIMPLEX WIRE & CABLE CO.**, Cambridge, Massachusetts and Newington, New Hampshire.

Simplex

Highest quality cables for: Mining • Power & Lighting • Construction • Transportation • Communications • Signalling

Each of the Fred D. Harless Co.'s seven Macks hauls 2800 tons of coal per week on a two-shifts-a-day, five-days-a-week basis. Mr. Harless depends upon his Macks to give dependable performance, with low maintenance costs, and he has never been disappointed.

Top profits ride on dependability

"Our Macks haul 20-ton loads of coal over mountainous terrain on both paved and unpaved roads, economically and dependably, even under adverse weather conditions," says Mr. Fred D. Harless, president of the Fred D. Harless Co. of Gilbert, West Virginia. "At one point in the hauling operation the trucks must ford a stream which is often axle deep or over, but the Macks have always come through where our other trucks have failed. We know from long experience that we can depend upon our Macks for economical operation, more profitable payloads, and the ability to keep on hauling, no matter what the weather or terrain."

More and more strip mine operators and independent haulers are relying on Macks. In rugged mountain terrain like this, it takes a truck with the built-in endurance, economy and power of a Mack to deliver profit-making payloads—day after day, month after month—with little or no profit-stealing downtime.

Mr. Harless is enthusiastic about the superior job Macks have done for him. For on-the-job performance figures and names of Mack users in your area, call your nearest Mack branch or distributor. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

5504

MACK
first name for
TRUCKS

How to move more coal... for less money with a **GOODMAN ROPEBELT CONVEYOR**

A Goodman Ropebelt will move all the coal you can produce and do it for less than any other conveyor you can buy. Here's how and why:

Low first cost: Intermediate sections of a Ropebelt cost nearly 50% less than those of conventional conveyors.

Low cost of installation and extension: Operating records at various mines* show Ropebelt can be installed or extended in ⅓ the time required for conventional conveyors.

Low cost of moving components: These same records show that components of a Ropebelt can be moved to point of use in far less man-hours than needed for moving conventional components and require less than ⅓ as many mine cars for hauling.

*Names and details on request.

Here's the skeleton of a Ropebelt. It's easy to see why it's so easy to install and extend . . . why it takes so few cars to haul its components. Note the flexible construction . . . no fixed idlers to bump and bounce the load . . . no impact stress and strain on the belt.

Saving in belt cost: Usually a lighter ply belt can be used on a Ropebelt. Only enough plies are needed to handle horsepower of drive. No extra strength needed for tension or impact resistance.

Ropebelt is simple . . . light in weight . . . with a minimum of parts. Result . . . fast, easy installation, extension and moving.

Ropebelt Conveyor is flexible . . . resilient. There is no rigid framework. Parallel wire ropes carry linked idler assemblies over which the belt travels. There is no "load-bounce". The wire ropes and idlers "give" in accordance with the weight carried. Result . . . a smooth ride with practically no spillage.

Add up these money-saving, time-saving advantages. You'll see why Ropebelt is the most useful, practical and economical conveyor you can buy. Want details? Write us today . . . no obligation.

GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

Every dipper-full weighs 80 tons! The "River Queen", largest power shovel ever to come out of the Bucyrus-Erie shops, can move over 33,000 tons of earth and rock overburden in a single 8-hour day—enough to fill a freight train six miles long. The "River Queen" flies the colors of the River Queen Coal Company near Greenville, Kentucky, a joint strip-mining venture of the W. G. Duncan Coal Company and the Peabody Coal Company and operated by Peabody.

OKOCORD keeps the big ones digging!

She's a big one, all right. Towering as high as a 13-story building, tipping the scales at over twenty-four hundred tons, the "River Queen" is one of the largest pieces of mobile land machinery ever sent into action. And she's powered by a 3-inch, 3/c portable Okocord cable.

She's a hungry one, too! She gobbles up 55 cubic yards of dirt and crushed rock in every bite. She draws 4,160 volts of electricity from her Okocord cable to run the 15 huge electric motors that give her the muscle power to move, wheel and dig.

She needs that power every second—or two and a half million dollars worth of equipment is immobilized. That's why Okocord trailing cable was selected to stand up to constant reeling and unreeling . . . to twisting and scraping as it's dragged over rocky ground . . . to being left for days on end in water and muck.

You should know about Okocord, too, whether you operate the world's largest power shovel or a simple portable drill. It's so easy—just write for Bulletin CA-1108, The Okonite Company, Passaic, N. J.

where there's electrical power . . . there's **OKONITE CABLE**

8416

the bits of The Bowdil Company are sold and known in the trade by the following registered trademarks

BOWDIL

TRADEMARK REGISTERED
U. S. PATENT OFFICE

THE FLAT SIDE BANDS ON OPPOSITE SIDES OF THE BIT IS THE REGISTERED TRADEMARK OF THE BOWDIL COMPANY . . .

. . . AND BITS MADE BY THE BOWDIL COMPANY ARE IDENTIFIED BY THIS TRADEMARK.

The BOWDIL COMPANY

Designers, Manufacturers and Distributors of Cutter Bars, Chains and Bits • Rope Sockets • Coal Drills • Miners' Picks and Spike Pullers • Bronze Bushings • Sales Agents for Cincinnati Electric Drills

BOYLAN AVENUE S. E. • CANTON 7, OHIO

• Keep coal from freezing
• Build better customer relations
• Speed car turn-around

Order Sterling Rock Salt now—regular or "Inhibium Treated" for maximum protection against corrosion of metal equipment. Available in bulk or handy 100-lb. bags from International's strategically located mines.

. . . treat your coal shipments with Sterling Rock Salt

It takes so little time and effort to apply Sterling Rock Salt! Just two to four bags of this effective antifreeze agent will keep an entire carload of coal from freezing. Sterling Rock Salt can be quickly applied, handles easily, is harmless to hands and clothing. It dissolves slowly, to give long-lasting antifreeze action. *Your customers will gladly pay the small premium for coal they can unload without first having to thaw it out.*

You can also use Sterling Rock Salt to prevent frozen scales and switches . . . and to keep roads and yards clear throughout the winter. It removes snow and ice *fast.*

INTERNATIONAL SALT CO., SCRANTON, PA.

Sales offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N.Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR INDUSTRY, FARM, AND THE HOME—
STERLING SALT
PRODUCT OF INTERNATIONAL SALT CO., INC.

GENERAL CABLE!

SUPER SERVICE

PORTABLE POWER and MINING CABLE

5 KV *Super Service* Type SH-D cable at work on the $50,000,000 Great Salt Lake fill project. Morrison-Knudsen Company selected *Super Service* as the most dependable, long-lived shovel power cable for hard service in rugged terrain.

UNBEATABLE PERFORMANCE

under toughest service conditions

Exclusive construction features give General Cable's *Super Service* portable power cable superior durability and long life under the most severe conditions. *Supertuf* mold-vulcanized neoprene sheath has unequalled resistance to wear, cutting and other mechanical abuse. Double-layer cord reinforcement adds extra strength. Sheath has outstanding resistance to water, oil, acids, alkalis, flame, sunlight and weathering. Available in a *complete* line from 600 V to 15 KV.

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N.Y.
Offices and Distributing Centers Coast-to-Coast

for quality and service . . . specify **GENERAL CABLE**

KOEHRING WORK CAPACITY *in action* . . .

A new 2-yard — Latest addition to the big Koehring line of excavators for mining and quarrying is this new 805. It's a heavy-duty 2-yard machine, with 25-foot deep-section shovel boom, and 18½-foot dual dipper sticks. You'll like the 805's power, strength, stability in heavy digging — and *extra capacity* as a dragline or crane for stripping, stockpiling, lifting. It handles 2 to 3-yard dragline bucket — lifts up to 52 tons.

"Diving" for gravel — Loading out of a water-filled gravel pit (right), this 405 dragline puts production on a big-tonnage basis. It has plenty of work-radius for this type of operation — can be used with 40 to 90 feet of boom, and handles 1 to 1½ cu. yd. bucket depending on weight of materials. Check its other work capacities on opposite page, then let your Koehring distributor show you what the 405 will do for you.

Re-working a slag bank — Once cast aside as waste, slag is now being reclaimed from this bank, run through a crusher, and used as sub-base material on road construction. During the process, slag is swept by a magnet to remove any scrap metal. Here, a Koehring 1½-yard 605 shovel loads the slag into Dumptors for haul to crushing plant. This combination of Koehring shovels and Dumptors makes a heavy-duty, high-production team. 6-yard Dumptor® climbs 24% grades fully loaded, dumps in one second, travels at same high speeds in either direction — no need to turn.

Mining copper ore — At this open-pit mine in the Southwest, overburden has been stripped down to pay-dirt. Next, a Koehring ½-yard 205 loads out copper-bearing ore for haul to smelter. Powerful crowd, fast retract, smooth swing, and instant dipper-trip speed production in the pit, keep trucks on the run.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? See Koehring distributor.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

Triple-deck dewatering and sizing machine in action. Stainless Steel screen is bottom deck.

Closeup of Stainless Steel screen. There is no sign of blinding.

Stainless Steel screen eliminates blinding at W. P. Stahlman Co., Corsica, Pa.

W. P. Stahlman operates large stripping mines near Corsica, Pa. The coal is trucked to a nearby cleaning plant where it is crushed, cleaned and sized.

Recently, they installed a Stainless Steel deck in a triple-deck dewatering and sizing screen to replace a carbon steel screen that failed after about eight months of service. Failure occurred where the very high-pressure water hit the screen. The old screen blinded, and prevented undersize coal from falling through.

The operators report vastly improved performance with the new Stainless Steel screen because the end product is better and more uniform in size.

If you keep careful tonnage records, you'll find that Stainless Steel screens and chutes are almost always the cheapest that you can buy . . . in terms of cost per ton of processed coal. For more information on reducing costs, write for "More Output in Preparation Plants . . . " and for our booklets on Stainless Steel in the Sunnyhill and the new Corbin plant. Address: United States Steel, Room 2801, Pittsburgh 30, Pa.

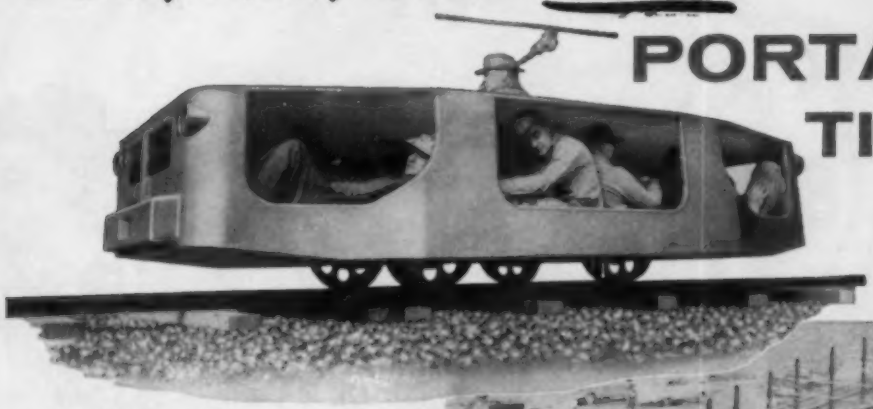
UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL USS

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

You, too, can *reduce* PORTAL TIME *up to 50%!*

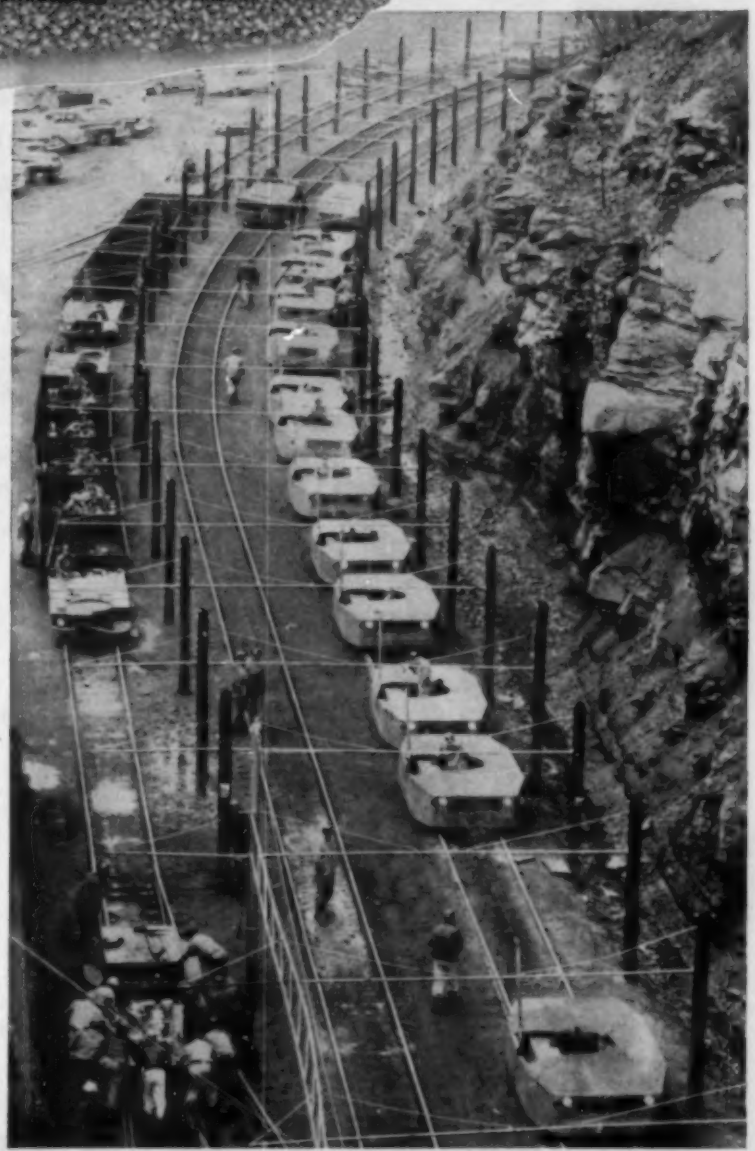


TJ5 Mine Portal Bus, "Low Type"

Lee-Norse *Self-Propelled* MINE PORTAL BUS

Factual performance records prove that the Lee-Norse Mine Portal Bus can effect up to 50% savings in portal time . . . savings that result in more man hours at the section face . . . increased tonnage at a reduction in overall cost per ton.

Built in low and high types to suit your haulage road, the Mine Portal Bus features complete safety —two separate braking systems . . . split-roof design that allows operator full vision at all times.

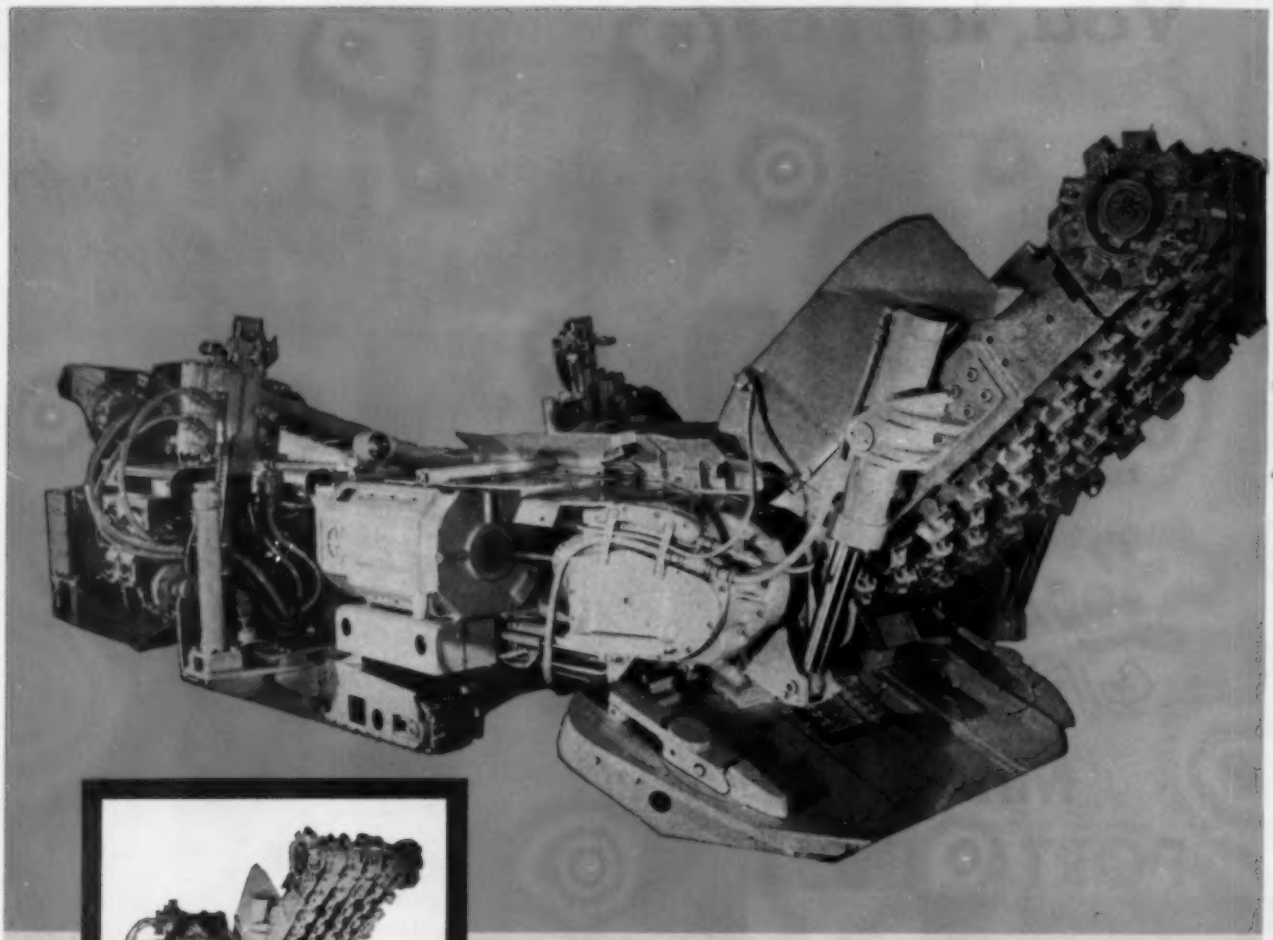


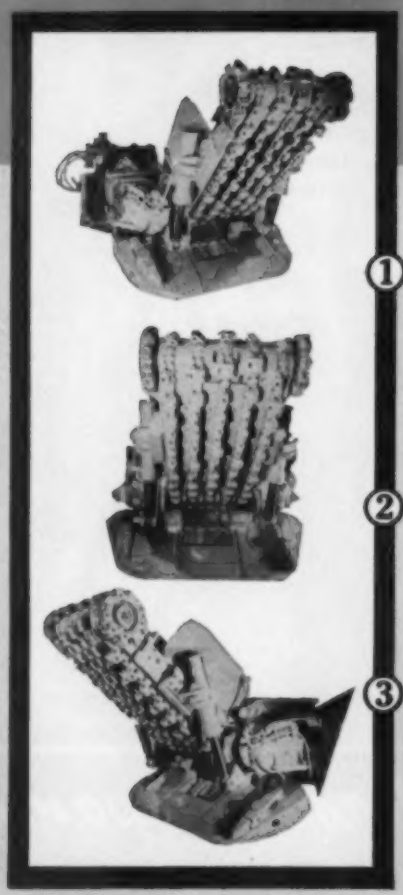
Get your personnel to and from the working face quicker . . . safer! Check the advantages of the Lee-Norse Mine Portal Bus.

Lee-Norse Company

Specialists in Coal Mining Equipment

HARLEROI, PA.





1 GATHERING ARM CLEAN-UP

The rugged clean-up works on the same proven principle as Joy Loaders . . . speeds up pillar extraction. The operator can clean up old workings, rooms, and crosscuts . . . in an 18′ room, the miner can clean up the entire bottom to within 8″ of rib.

2 EXTRA LARGE RIPPER HEAD

The 42″ wide ripper head with extra deep sump (increased to 21″) results in greatly increased tonnages. The new head also results in more ripped coal and less fine coal.

3 DIRECT ACTING SHEAR JACKS

More powerful shear jacks easily maneuver the extra large ripper head. These jacks eliminate chains and linkages; reduce maintenance. Jacks are inverted . . . keeps dust from cylinders.

25% Higher Tonnage

The New JOY 1CM-3 Miner

Produces 4½ Tons Per Minute

THESE

NEW FEATURES

MAKE IT POSSIBLE

- 21" SUMP
- GATHERING ARM CLEAN-UP
- 42" WIDE RIPPER HEAD
- DIRECT ACTING SHEAR JACKS
- INCREASED POWER
  250 HP STANDARD
  276 HP WITH ROOF DRILLS
  286 HP WITH DUST COLLECTORS FOR ROOF DRILLS

WRITE FOR BULLETIN 182-1

The new Joy 1CM-3 is a 47" high continuous miner for driving entries, mining rooms and extracting pillars, in seams 60" and higher. It is an entirely new machine with every new feature engineered into it as a result of Joy's long experience in the continuous miner field. It has the power to produce up to 4½ tons per minute.

Less time is involved in clean-up operations because of a completely new clean-up design that works on the gathering-arm principle. The new clean-up handles draw slate and old workings.

Find out how the new 1CM-3 will fit into your operations . . . write *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY EQUIPMENT FOR MINING . . . FOR ALL INDUSTRY

CONTINUOUS MINERS

LOADERS

DRILLS

CUTTERS

WSW CL 6662-182

foundry coke producer's viewpoint

MR. FRED H. BOHL, VICE PRESIDENT, MILWAUKEE SOLVAY COKE CO. SAYS:

"FOR QUALITY FOUNDRY COKE WE MUST CHOOSE THOSE COALS THAT EMBODY THE ADVANTAGES OF MODERN PREPARATION FACILITIES"

Producers of gray iron and malleable castings are today, required to make careful selection of raw materials. Foundry coke is perhaps the most important of these materials.

Since the components of coke are an integral part of metal itself, coal's application for coke making differs from that of other industries. The quality foundry coke producer must use coals that are uniformly prepared, low in ash and low in sulphur.

For this reason, in our final selection to sustain quality foundry coke production we must choose those coals which embody the advantages of modern preparation facilities to assure the uniformity of our coke.

Fred H. Bohl,
Vice President
Milwaukee Solvay Coke Co.

Why choose Roberts & Schaefer for your next job?

Before you send out your specifications—why not inquire? Ask any of the successful producers in your district—why they choose Roberts & Schaefer?

Roberts & Schaefer Experience—Reliability—Resourcefulness

R & S Engineers will help you find the best way quicker and more economically because of their highly specialized experience. At Harvey, Illinois, our new pilot plant will demonstrate under actual working conditions and tests the results you will obtain from every major functional process before you buy.

Saves time—Eliminates guesswork

Regardless of manufacturers equipment included in your plans, Roberts & Schaefer engineers synchronize delivery, construction and fabrication under their supervision to give you on time delivery and a more workable plant.

EXPERIENCE

RAYMOND T. MIDDLETON
District Sales Manager

HAS PARTICIPATED IN THE SALE, DESIGN AND CONSTRUCTION OF OVER 600 COAL PREPARATION PLANTS IN PENNSYLVANIA AND WEST VIRGINIA. Ray Middleton after graduation in Engineering at University of Michigan received his early training in construction with the American Bridge Co. and Detroit Bridge and Iron Co.

Middleton joined Roberts & Schaefer Co. in 1914 and his 43 years with the Company makes him the most experienced sales executive in the organization. Middleton sold the first Stump Air Box, now known as Super Air-flo in 1924.

This wealth of knowledge and experience on every phase of coal preparation and efficient coal handling has helped make him one of the most valuable representatives of the R. & S. organization, and one of the most informed in the coal industry.

ENGINEERS AND CONTRACTORS

ROBERTS AND SCHAEFER COMPANY

130 NORTH WELLS STREET CHICAGO 6, ILLINOIS

PITTSBURGH, PA. HUNTINGTON, W. VIRGINIA NEW YORK, N.Y.

ROBERTS R&S AND COMPANY **SCHAEFER**

A new line of Standard Oil greases

RYKON

GREASE

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

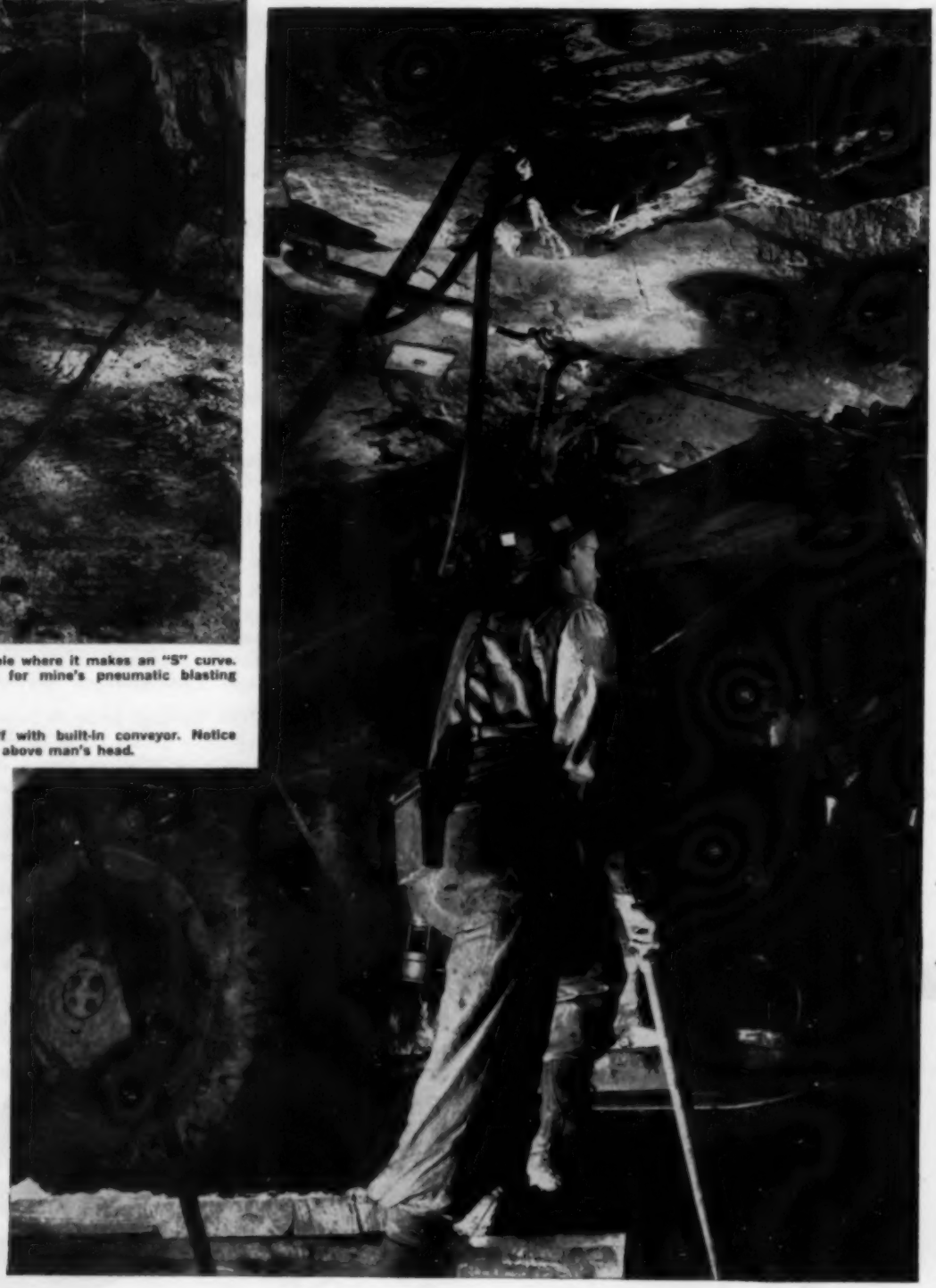
Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

"We increased our cable life

Supervisor checks the cable where it makes an "S" curve. Thin tubing overhead is for mine's pneumatic blasting system.



Shuttle car unloads itself with built-in conveyor. Notice twisted Tiger Brand cable above man's head.

with TIGER BRAND,"

—*says Master Mechanic of a large Pennsylvania mine*

THE mine shown here is clean and modern, but it has just one purpose: to produce coal at a profit under safe working conditions. The mine has about 30 miles of trackway, and produces about 4,500 tons daily. About a dozen shuttle cars are in constant use, between rail heads and working faces that are frequently 100 to 200 yards apart.

The shuttle car electrical cable takes a terrific beating. The car often takes a circuitous route, and the cable is pulled tight around the corners of standing coal while it is reeled and unreeled without stop for the entire shift.

The Tiger Brand cable has outlasted the previous cable by a considerable margin. This is partly due to our "Bridgewall" construction, which actually puts a sheath of live jacket rubber around each conductor. Even when the cable is kinked or smashed, the conductors are protected by a thick wall of the toughest jacketing compound available in the industry.

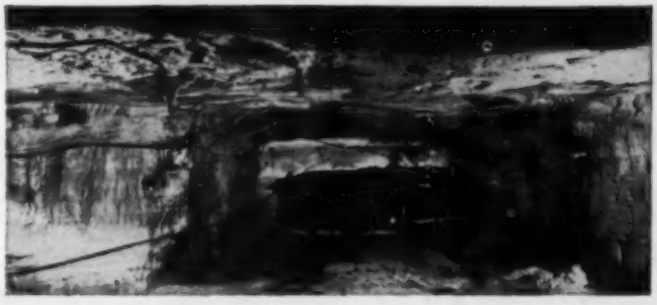
The other factor that contributes to long trouble-free life is the dynamically balanced rope lay conductors. Concentric stranded wires of the ideal size—as opposed to loosely bunched groups of fine wires—are carefully prestressed to give balanced performance and freedom from unequal elongation between conductors.

Tiger Brand cable isn't cheap, but it's a good investment for any company that needs long, hard service. See your American Steel & Wire salesman.

AMERICAN STEEL & WIRE DIVISION
United States Steel, General Offices: Cleveland, Ohio
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY NEW YORK

Workman ties up cable. Spring-loaded strain reliefs are used when possible. Tape on cable prevents it from slipping through the relief.

Shuttle car makes return trip. Cable feed center is out of picture 100 yards or so to the left, near the rail head.



USS TIGER BRAND ELECTRICAL WIRE & CABLE
a standard Tiger Brand cable for every special job

- Asbestos Wire and Cable
- Mold Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

USS

UNITED STATES STEEL

Mountain-scaling International® earns $3,400 annual production

hauling slate up winding 16% grade for Corte Construction Co., W. Va.

Compared to a competitive hauler on the job, this International® "65" Payhauler® earns a $3,400 annual production bonus—for Corte Construction Co., Kimball, West Virginia. Working double shift, the "65" hauls 160 tons more of slate daily, up a mile-long, twisting mountain road that has a 16% adverse grade!

Production-boosting Payhauler capacity comes from such features as ample, turbo-charged diesel power—and load-matched gear ratios. Proper Payhauler weight distribution is a big help, too—74% of total load is on the "65" drive wheels, giving sure "action-traction"!

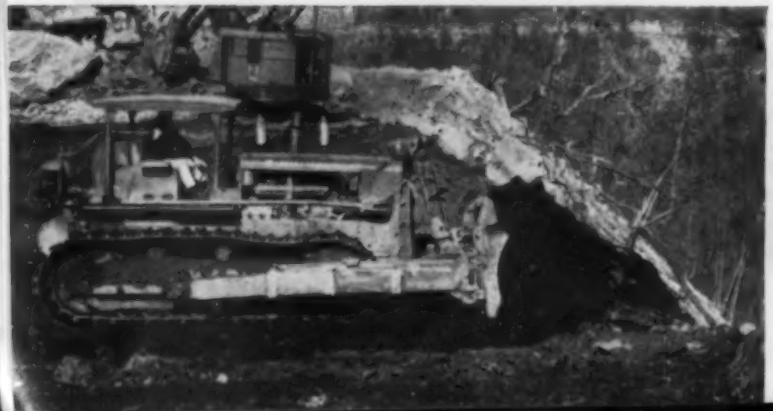
And there's no beating the power-transfer efficiency of the International Cerametallic-faced clutch!

"International power produces bonus"

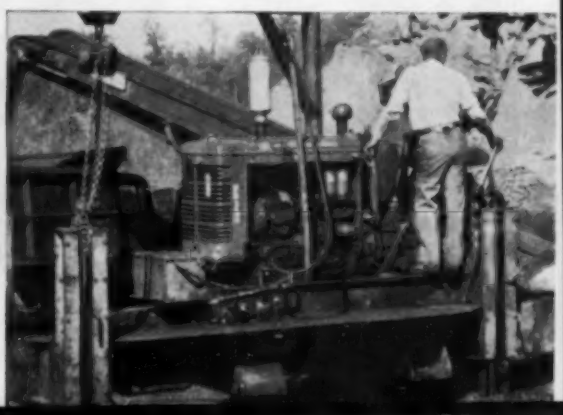
The Corte Co. is using International equipment from peak to base of this coal-veined mountain—contract mining and hauling coal, and moving waste upgrade to improve the haul-road. At the summit, a TD-24 speeds removal of shot-rock from the seam of Pocahontas. Three International-powered McCarthy Augers roll out coal from the highwall!

"Our side-boarded '65' Payhauler produces a 4-ton bonus each trip, compared to our other truck," states Partner Stilio Corte. "We also get the same kind of production from our TD-24 and our power units. That's why we've stayed with International since starting in business 11 years ago."

TD-24 seam-cleaning production is high on this stripping operation. Here shot rock has already been removed and the seam is being cleaned of dirt ahead of loading-out operations.



This UD-350 International-powered 24-in. McCarthy coal auger is one of two that bores and loads out 75-100 tons per shift. A UD-525 powers a 36-in. auger and mines 125-150 tons of coal in the same period.



"65" Payhauler® bonus—

Heaped and highballing, the Corte International "65" Payhauler is shown on the twisting, 16% mountain slope carrying 4 more tons of slate than the other rear-dump on the job can handle. A total of 40 trips are made in the two 6-hr. and 45-min. shifts worked daily.

Prove you can get big-profit bonus production on your coal-stripping operations. Call your nearby International Construction Equipment Distributor for an on-site demonstration!

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

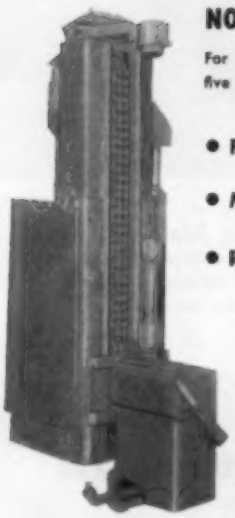
A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

BUILT FOR BOLTING IN YOUR MINE!

That's why more mines use FLETCHER Roof Control Drills than all other makes combined!

For **LOW** Seams

For **HIGH** Seams



NOW . . . Continuous MINER DRILLS

For installation on ripper miners as shown, and five new styles to work with boring-type miners.

ADVANTAGES

- **Flex-mounting to allow bolting while mining.**
- **Mast against roof to provide safety and stability.**
- **Rugged construction for low maintenance.**

Fletcher ROOF CONTROL DRILLS

THERE are FLETCHER Roof Control Drills designed for seams varying from 30" to 14 feet in height. *And,* because each mine has special requirements — variations in Roof Height, Roof Hardness, Bolt Length, Bolt Pattern, Capacity, Mine Voltage, Mining System, etc. — *FLETCHER machines are tailored to meet these problems.* FLETCHER offers complete flexibility of dimensions or features to meet your specifications. So—if your roof drilling problem is high bit cost, tough materials, or slow bolt installation rate — you'll want to learn more about FLETCHER Roof Control Drills. See your FLETCHER representative.

J. H. FLETCHER & CO. | P. O. Box 353, HUNTINGTON 8, WEST VIRGINIA Phone 44186

there's always a **1st**

NOW

PERMISSIBLE EXPLOSION-PROOF UNITS

Increased production — less down-time and greater safety are now possible with the new KERSEY BATTERY-POWERED PERMISSIBLE EXPLOSION-PROOF TRACTORS AND UTILITY TRUCKS.

Approved by The U. S. Bureau of Mines (Acceptance No. 2-1285) Kersey Permissible Equipment is one more indication of how Kersey continues to design and build a wider range of mine haulage equipment to meet the increased need for coal — and better ways to mine it.

in design

in engineering

in performance

in service

In Mine Haulage Equipment it's

KERSEY
MANUFACTURING CO. INC.
BLUEFIELD, VIRGINIA

When You Want Modern Equipment for Modern Haulage and Want the Best — *CHECK WITH KERSEY FIRST!*

Here's how a pre-fab track layout begins

Here is the initial phase of a cost-cutting new mine-track layout. All Bethlehem pre-fabricated track-work jobs begin this way, with a thorough on-the-site study of the customer's operations by an experienced Bethlehem engineer.

This first step is absolutely essential to the next one, in which the engineer will go into a huddle with additional Bethlehem specialists who will draw up the complete plans for the project. Because the plans will be based on first-hand knowledge of the mine's requirements, they will be entirely workable and efficient.

After the customer gives final approval, the rail and all track components are manufactured precisely in accordance with the plans. Then everything (and this means *everything*, down to the last bolt and splice bar!) is completely preassembled in our shops to be sure of swift and easy installation at the work-site.

If all this sounds like luxury to you, we can quickly show you how the Bethlehem approach is actually the most economical one you can take. Material waste is eliminated, installation time is minimized. On top of that, a Bethlehem tailor-made layout will soon pay for itself in operating economies. Let one of our engineers discuss your specific problem in detail with you. You can reach him through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation; Export Distributor: Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

JUST OUT!

All-new '58

DODGE *PowerGiants*

4-WAY LEADERS OF THE LOW-PRICED 3

Now—for the first time in truck history—one make leads the low-priced three *all four ways!* And that make is DODGE—all new for 1958!

From the future comes Dodge styling — handsome, sweeping, prestige-winning lines, richly trimmed in sparkling chrome.

From 40 years of truck experience comes remarkable engineering advances . . . outstanding performance, load capacities and economy.

See these great new trucks soon. And be *sure* to get your Dodge dealer's special 40th-anniversary deal before you buy any other make!

1 **FIRST IN PAYLOAD!** Advanced construction gives extra strength *without* extra weight, lets you haul up to ⅓ more, cut down on trips.

2 **FIRST IN POWER!** New 204- to 234-hp. *Power Giant* V-8's! Extra power cuts trip time, lets you pass more safely, reduces engine strain.

3 **FIRST IN ECONOMY!** Most advanced of all V-8 truck engines. Exclusive Power-Dome combustion increases gas mileage, cuts upkeep costs.

4 **FIRST IN STYLING!** All-new design! Deluxe chrome grille and trim . . . modern dual headlights . . . future-inspired lines . . . smart new colors.

TURN PAGE FOR FULL-LINE STORY →

There's a

'58 DODGE *PowerGiant*

for every job . . . for every business . . . for every pocketbook

Low-tonnage models

Pick-up
model 100

Town Panel
model 100

Town Wagon
model 100

Forward-Control
model P300

Medium-tonnage models

Model 400
Van Body

Model 500—Stake

Four-Wheel-Drive
W500
Chassis

Model 600
Tractor

Heavy-duty models

C.O.E. model 700

Model 900—
Tractor

Model T800—
Mixer Body

Model T900—
Dump Body

CONDENSED SPECIFICATIONS

CONVENTIONAL MODELS

G.V.W. Range
4,250 lbs. to 9,000 lbs.
Engines
120-hp. 6-cylinder
204-hp. V-8

4-WHEEL-DRIVE MODELS

G.V.W. Range
5,100 lbs. to 10,000 lbs.
Engines
113- 120- 125-hp. 6-cyl.
204-hp. V-8
204-hp. V-8 (Heavy-Duty)

FORWARD-CONTROL MODELS

G.V.W. Range
6,000 lbs. to 9,000 lbs.
Engines
120-hp. 6-cylinder
204-hp. V-8

CONVENTIONAL MODELS

G.V.W. Range—11,000 lbs. to 22,000 lbs.
Engines—125- 130- 141-hp. 6-cyl.
204- (H.D.) 207-hp. V-8's

C.O.E. MODELS

G.V.W. Range—15,000 lbs. to 22,000 lbs.
Engines—204- (H.D.) 207- 218-hp. V-8's

4-WHEEL-DRIVE MODELS

G.V.W. Range—15,000 lbs. to 20,000 lbs.
Engines—130-hp. 6-cylinder
204- (H.D.) 207-hp. V-8's

SCHOOL BUS MODELS

G.V.W. Range—10,500 lbs. to 22,000 lbs.
Engines—125- 130- 141-hp. 6-cyls.
204- (H.D.) 207-hp. V-8's

FORWARD-CONTROL MODELS

G.V.W. Range—7,500 lbs. to 15,000 lbs.
Engines—120-hp. 6-cylinder
204-hp. V-8

CONVENTIONAL MODELS

G.V.W. Range
18,500 lbs. to 30,000 lbs.
Engines
218- 224- 234-hp. V-8's

C.O.E. MODELS

G.V.W. Range
18,500 lbs. to 25,000 lbs.
Engines
218-hp. V-8

TANDEM MODELS

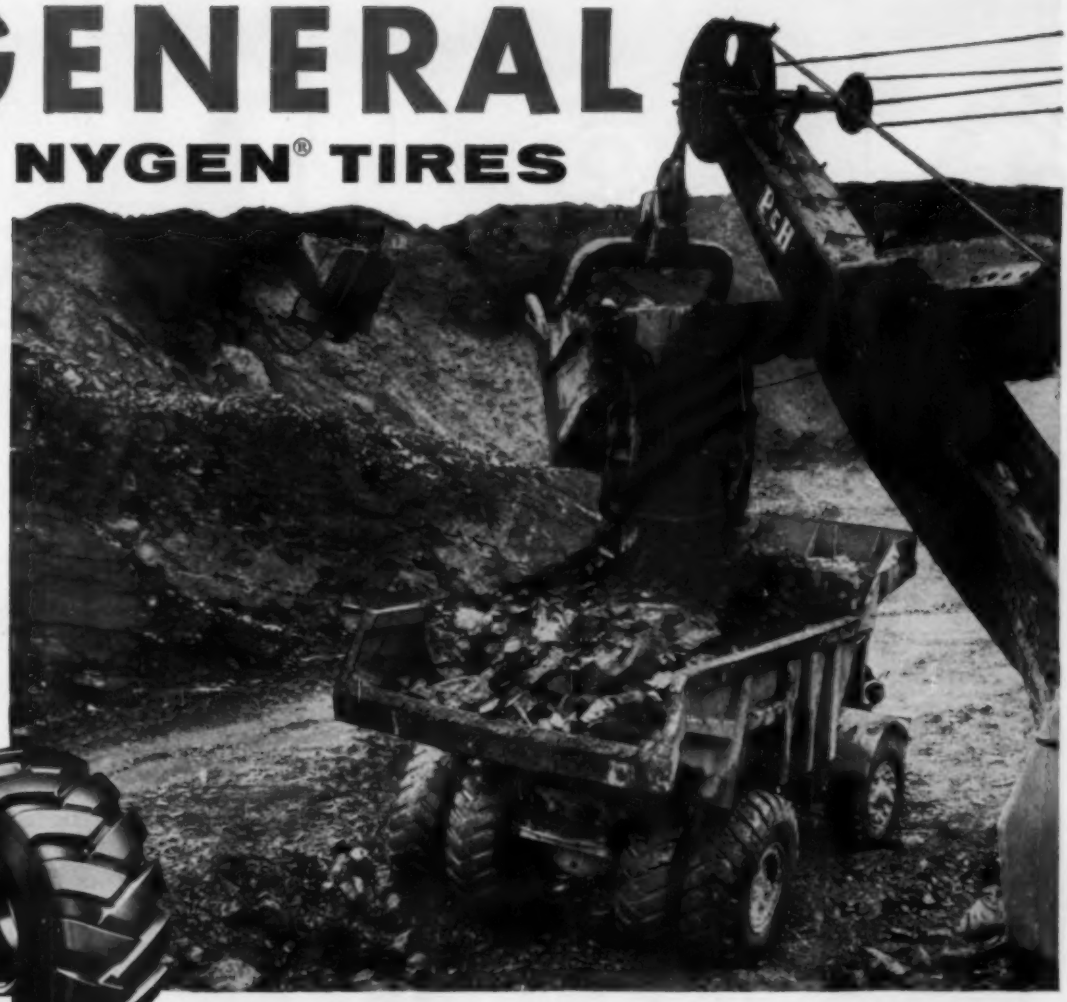
G.V.W. Range
26,000 lbs. to 46,000 lbs.
Engines
218- 224- 234-hp. V-8's

SCHOOL BUS MODELS

G.V.W. Range
17,500 to 23,000 lbs.
Engines
218-hp. V-8

GENERAL

NYGEN® TIRES



ALL DUTY L. C. M.

LOGGING CONSTRUCTION MINING

DUAL TRACTION LUG

EARTH MOVER

H. C. T. LOGGER

TRACTOR GRADER

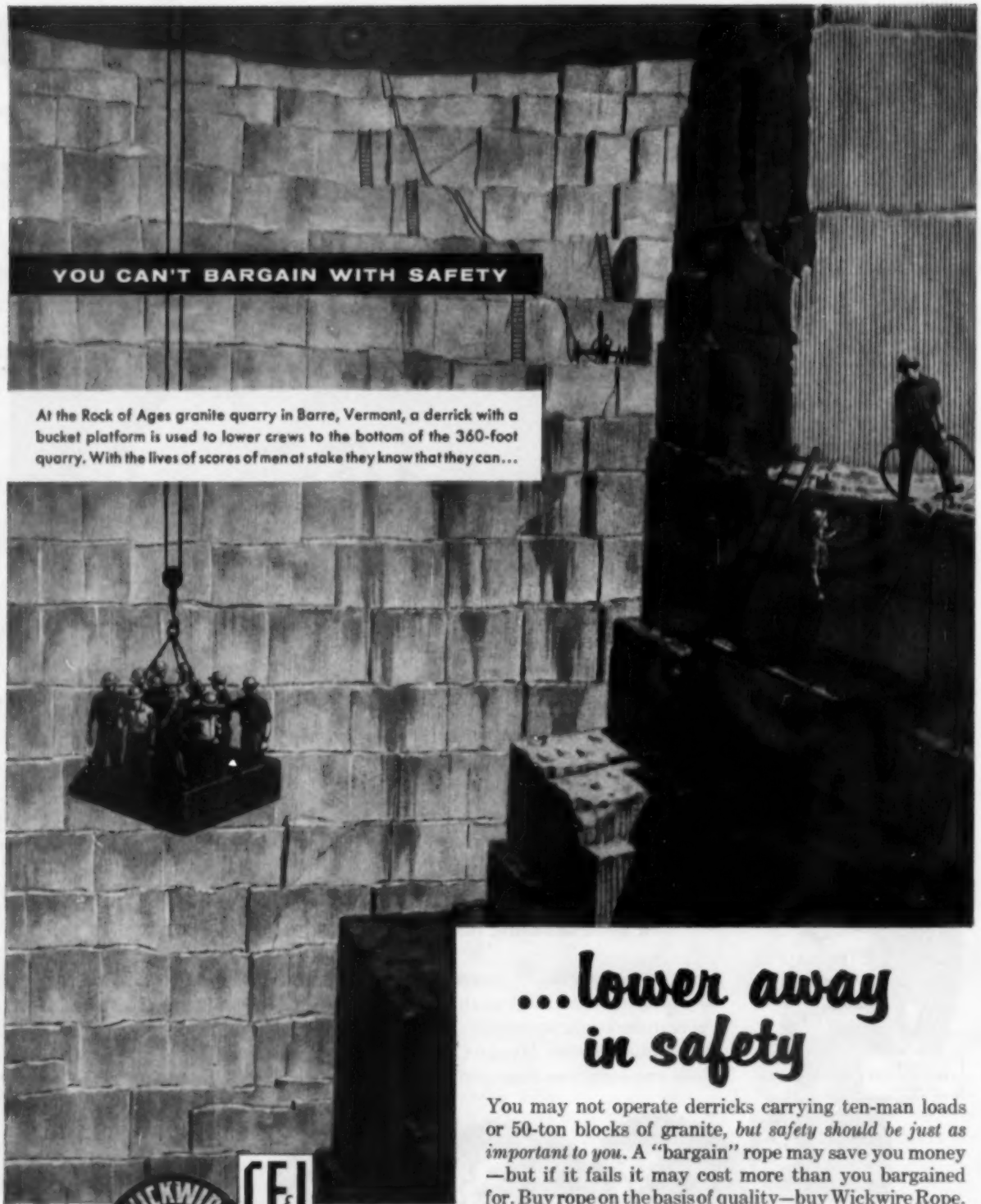
Moving Montana mountains in record time for Morrison-Knudsen on back-breaking Noxon Rapids Hydroelectric Project!

Daily, on construction, logging, mining and quarrying jobs from coast to coast, durable, dependable General Nygen Tires continue to amaze veteran fleet operators with their ability to cut costs and increase profits. Built tougher with Nygen Cord for the toughest jobs, General Nygen Tires can save you time and money starting today! Why not let them?

specify **GENERALS** *on new equipment*

THE GENERAL TRUCK TIRE

THE GENERAL TIRE & RUBBER CO. • Akron, Ohio



At the Rock of Ages granite quarry in Barre, Vermont, a derrick with a bucket platform is used to lower crews to the bottom of the 360-foot quarry. With the lives of scores of men at stake they know that they can...

...lower away in safety

You may not operate derricks carrying ten-man loads or 50-ton blocks of granite, *but safety should be just as important to you.* A "bargain" rope may save you money —but if it fails it may cost more than you bargained for. Buy rope on the basis of quality—buy Wickwire Rope.

WICKWIRE ROPE
A CF&I PRODUCT

CF&I

LOOK FOR THE YELLOW *TRIANGLE*

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso Farmington (N.M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City • Phoenix • Pueblo Salt Lake City • Tulsa • Wichita • **PACIFIC COAST DIVISION**—Los Angeles • Oakland • Portland • San Francisco • San Leandro Seattle • Spokane • **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia

At Moss Mine #2
and again at Moss Mine #3...

CLINCHFIELD COAL PREFERS REINEVELD FINE COAL DRYERS

View of Coal Preparation Plant at Moss Mine #2

Battery of Four Reineveld Fine Coal Dryers at Moss Mine #2

The performance of the four Reineveld Fine Coal Dryers at Moss Mine #2 earned them a place in the new Preparation Plant now being built for Moss Mine #3 where twelve Reineveld will be installed. Also, eight H & P 24" Raw Coal Cyclones were selected for Moss Mine #3.

From mine portal to market, Heyl & Patterson has served the Coal Industry since 1887 with . . .

Complete Coal Preparation Plants
Bradford Coal Breakers
Reineveld Fine Coal Dryers
H & P Wet Cyclones
Thermal Dryers: Fluid Bed and Pallet
Thorsten Samplers and Crushers
Rotary Car Dumpers
Boat & Barge Loaders and Unloaders
Specialized Conveying Systems

70 YEARS OF SERVICE

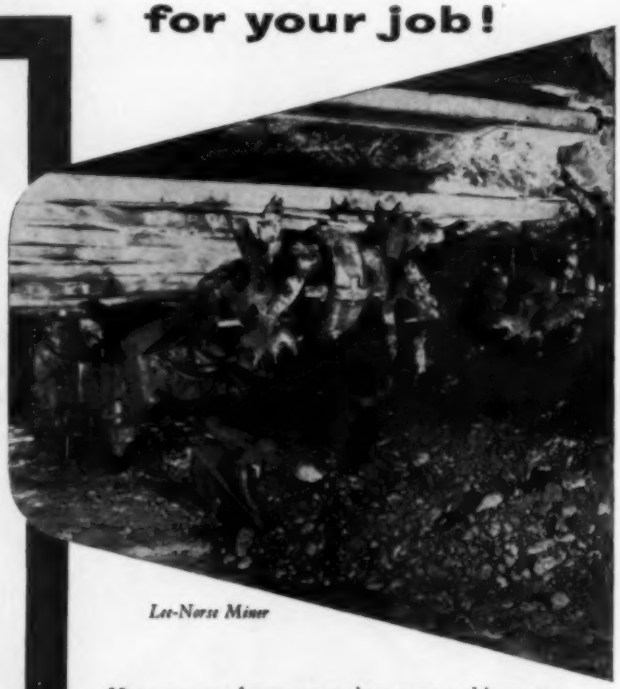
Heyl & Patterson INC.

55 FORT PITT BLVD. • PITTSBURGH 22, PA.

Let your CARMET DISTRIBUTOR help you

Choose the right mining tool bit

for your job!



Le-Norse Miner

How can you lower operating costs and increase tonnage?

One way is to make sure you're getting all you should from your mining tool bits . . . that they're right for the job they're supposed to do . . . and that they are suited to your particular mining conditions.

These are matters your Carmet Distributor, with the aid of a Carmet mining engineer (they are located in every major coal mining area in the country), can advise on. Ask his help in establishing a complete mining tool control program. ***Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.***

Write for your copy of the CARMET MINING TOOL CATALOG and METHODS MANUAL

Illustrates full line of Carmet mining bits . . . giving tool dimensions, rake and clearance angles, etc. Specifies grinding wheels and procedures for reconditioning tool bits.

ADDRESS DEPT. CA-95

CARMET DISTRIBUTORS

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Offices: Buffalo, Rochester & Syracuse, N.Y.
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W. B. Thompson Co., Iron Mountain, Michigan

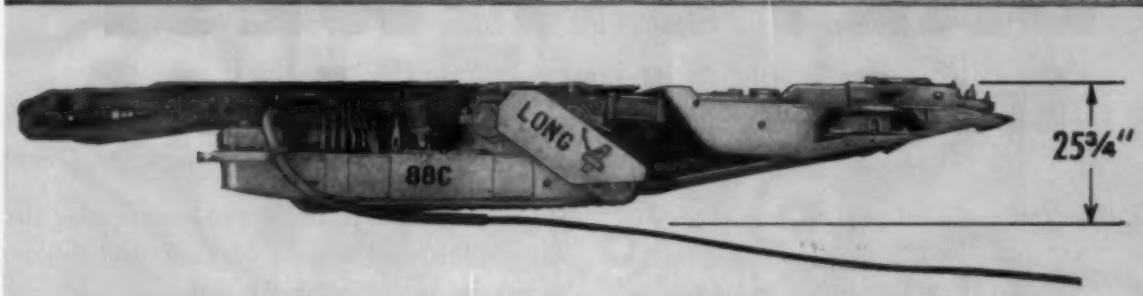
The Original DOUBLE-BONDED Carbide Bit

CARMET®

WSW 6053

NEW LONG Model 88-C PIGLOADER

with the lowest operating height of any high-capacity loading machine



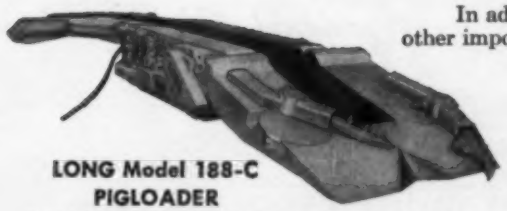
The only loader designed specifically for continuous loading with the Piggyback Conveyor System

Representing the first major innovation in loading machine design in many years, the LONG Pigloader* offers low operating height, straightforward design simplicity, minimum maintenance, high-capacity operation, full independent crawler control, unequalled stability, and unusual digging and tramming power—all vital to handling the high-concentrated tonnages of the Piggyback* Conveyor System of mining.

In this design, a single 40 HP electric motor drives all machine operations. All functions are controlled hydraulically from a single bank of finger-tip control valves. Maximum digging and tramming power is provided as the full 40 HP can be utilized for each operation. Long wheel base and wide tracks give exceptional stability and positive operation even in soft bottom. With the Pigloader's tramming and digging ability, it is able to go to the back of the cut with each pass at the face. Rated capacity is 4 to 6 tons per minute and tramming speed is 95 feet per minute.

In addition to its superior operating features, the Pigloader offers other important advantages. For example—it has fewer, heavier parts, and its simplified design greatly facilitates maintenance.

*Pigloader and Piggyback are trade marks (Reg. U.S. Pat. Off.) of The LONG Company



LONG Model 188-C PIGLOADER For Shuttle Car Loading

The Model 188-C is identical to the 88-C, except it is equipped with a swing boom for loading into shuttle cars.

Write for Bulletin No. 4010—or ask for a demonstration.

The LONG Company
Oak Hill, W. Va.

DART'S NEWEST in Coal Haulers

65 Cubic Yards of coal payload means greater profits. This major coal company already uses eight Dart 50-ton coal haulers, and six 20-ton gob haulers. Many major open pit coal mining companies agree that Dart truck designs are the most rugged, economical, and dependable serving the coal industry. The new 65-Yard model illustrated has an NFT 355 HP Cummins engine as heavy-duty power supply. Straight-line trailer appearance results from bolsters built inside, reducing maintenance and repaint costs.

TRACTOR FEATURES

355 HP Diesel Engine
Torque Converter
Semi-Automatic Transmission
Triple Reduction Planetary Axle
225,000 Lb. Gross Axle Capacity

TRAILER FEATURES

Troubleproof Hitch
Fully Sprung Axle
Extra Wide Doors
Rear Wheel Assembly Completely Interchangeable With Tractor Axle

Power for the Climb . . . Speed for the Haul Road

HEAVY DUTY TRUCKS EXCLUSIVELY SINCE 1903

DART TONNAGE ENGINEERED TRUCKS

Kansas City 8, Missouri
SUBSIDIARY OF THE CARLISLE CORPORATION

Ad No. D-135

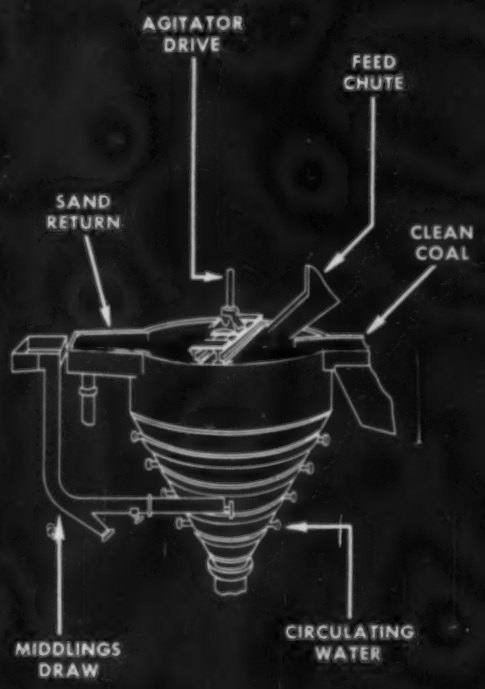
IT'S NOW

FAIRMONT BUILT—

the industry-proven

and time-tested

CHANCE CONE



Processing more than 50,000 tons of coal per hour throughout the industry.

■ The Chance Cone is now made only by Fairmont Machinery in the United States. Fairmont manufactures, sells and services (both new and old) this coal cleaning apparatus. The Chance System successfully processes coal of widely varying characteristics at operating specific gravities ranging from 1.35 to 1.65 with sizes from ⅛" to 10".

■ Thoroughly dependable, Chance Cones require only normal maintenance and will recover close to 100% of marketable coal at minimum cost per ton. The operation is handled by only the part-time attention of one man.

A Fairmont engineer will, of your request, discuss your particular coal cleaning problems and show you how a Chance Cone will give you consistently sized, well-cleaned coal.

FAIRMONT
MACHINERY COMPANY
FAIRMONT, WEST VIRGINIA

Designers and Constructors of Complete Coal Preparation Plants Using Both Wet and Dry Cleaning, Centrifugal and Thermal Drying.

Direct-current System Powers

Bucyrus-Erie's Giant "River Queen"

Direct-current drive system proves best source of both power and control—vital factors in shovel operations

Power alone is only half the story in shovel operations. *Control* is also a vital factor. And, with direct-current drives you get both high-torque power and instantaneous control for efficient, economical shovel operation.

"RIVER QUEEN," Bucyrus-Erie's giant 55-cubic yard strip shovel is an outstanding example of combined direct-current power and control in action. D-c equipped, the "Queen" is used for overburden stripping at the River Queen mine near Central City, Kentucky. This mine is owned jointly by Peabody Coal Co. and W. G. Duncan Coal Co. and is operated by Peabody.

POWER—The "River Queen's" dependable direct-current drives supply constant, stepless power to hoist, swing and crowd this giant machine efficiently and economically. This power is demonstrated daily in its open-strip mining operation. The shovel gouges out rock and earth in 80-ton bites, swings the load 295 feet, dumps it in 100-foot piles, and then returns for another 55-cubic yard bite. The duty cycle is repeated again and again, 24 hours a day, every day of the year.

ONE MAN CONTROLS the movements of this huge machine. The fast response and precise speed control enables the operator to make one complete duty cycle in less than a minute!

D-C DRIVES CAN HELP YOU increase tonnage mined and speed operating cycles in your shovel operations. And, the rugged construction of adjustable-voltage direct-current shovel drives means reduced downtime and a minimum of maintenance.

Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania. 811-6

Progress Is Our Most Important Product

GENERAL ELECTRIC

NEW 1958 CHEVROLET TRUCKS WITH NEW HUSTLE! NEW MUSCLE! NEW STYLE!

Just look at all they offer that's new and better . . . and you'll see why these new Chevies are the fleetest, sturdiest, handsomest dollar-savers yet! Meet Chevrolet for '58!

NEW MEDIUM-DUTY VIKINGS

Hardy Vikings roll in with nine brand-new models, offering new cab-to-rear-axle dimensions for improved semi-trailer, dump, stake and van-type operations. Options available boost GVW ratings all the way to 21,000 lbs. And you get traditional Chevrolet economy in the industry's most popular 6's and in V8's packing up to 175 h.p.

NEW HEAVY-DUTY SPARTANS

The robust Spartans make hauling history with the revolutionary 230-h.p. Workmaster V8 with Wedge-Head design. The combustion chambers are located in the cylinder block rather than in the cylinder head. Here's maximum power, less wear than ever. It's featured on 90 and 100 Series trucks as are sturdy cast-spoke wheels and an 18,000-lb. rear axle. Look over Task-Force 58 at your Chevrolet dealer's. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET

SEE THE LATEST EDITIONS OF THE "BIG WHEEL" IN TRUCKS—1958 CHEVROLET TASK·FORCE TRUCKS

How to select the right Link-Belt chain for specific coal service conditions

FILE HARD PROMAL makes this C-131 chain conveyor especially resistant to abrasive wear. Application is a tank-type heavy media vessel.

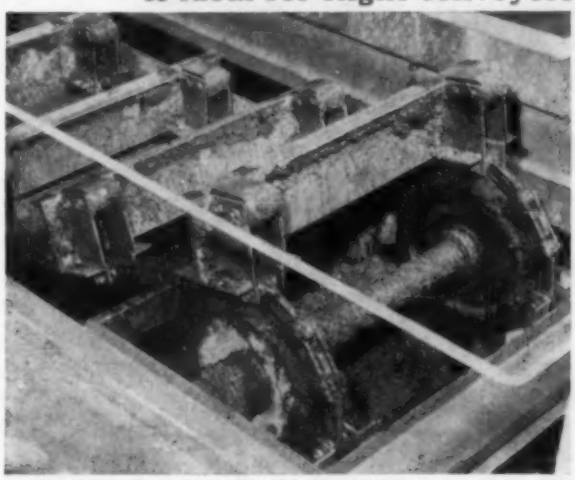
Use Class C chain for economy on drag conveyors, elevators

Here's a popular, durable, low-cost chain for elevator and conveyor applications. Because of its relatively broad top and bottom surfaces, it is particularly resistant to sliding wear, common to drag conveyor operation.

C Class chain combines two types of link construction into an economical chain assembly. Center links consist of simple, rigid and rugged castings . . . sidebars are made from selected steel . . . steel connecting pins are locked in the sidebars and only rotate in each end of the center link where generous bearing area is provided.

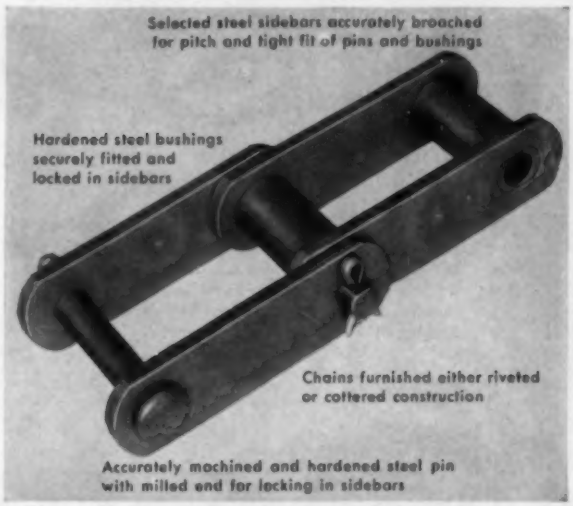
When conditions demand, Link-Belt manufacturing and application knowledge will produce a chain specifically tailored for your service. For example, center links are available in Promal and file hard Promal as well as malleable iron. Specially treated joints and special hardening in localized areas give greater wear-resistance. A wide variety of attachments is offered.

Lightweight rivetless chain is ideal for flight conveyors



FLIGHT CONVEYOR in coal preparation plant is a typical application of Link-Belt rivetless chain. It is ideally suited to this service, being high in strength and resistance to shock loads.

Although it has the light weight desired for long flight conveyors, Link-Belt rivetless chain offers the high strength at relatively low cost, needed to meet sudden impacts and heavy overloads. Open joint construction makes it ideal for operating in materials that have a tendency to pack. Simplicity of chain design permits dismantling by hand . . . lengths can be altered without tools.


Selected steel sidebars accurately broached for pitch and tight fit of pins and bushings
Hardened steel bushings securely fitted and locked in sidebars
Chains furnished either riveted or cottered construction
Accurately machined and hardened steel pin with milled end for locking in sidebars

LINK-BELT SS BUSHED CHAIN is especially engineered to resist chain joint wear under gritty or abrasive service.

SS bushed chain has extra-hard joint surfaces for abrasive jobs

Link-Belt SS bushed chain resists the abrasive wear encountered in coal handling operations. Hardened joint surfaces—up to five times harder than standard malleable, resist the cutting action of abrasive particles.

Sidebars of selected bar steel are accurately formed and machined for tight press fit of pins and bushings. These straight steel sidebars with hardened steel pins and bushings provide strength to prevent distortion under continuous heavy loads.

Many sizes of these heavy-duty chains are interchangeable with Link-Belt "C" Class. A wide range of attachments makes them adaptable to specific coal service requirements.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

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CHAINS AND SPROCKETS

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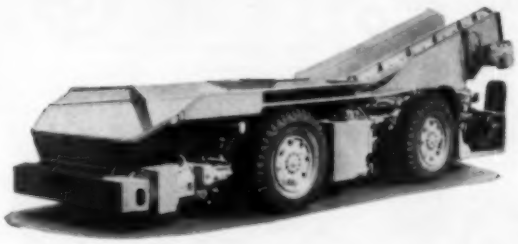

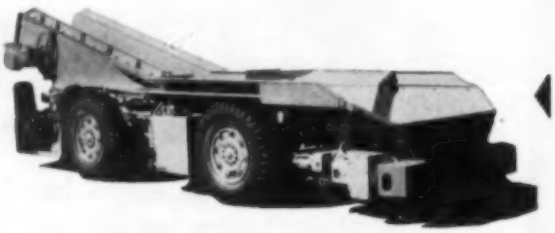

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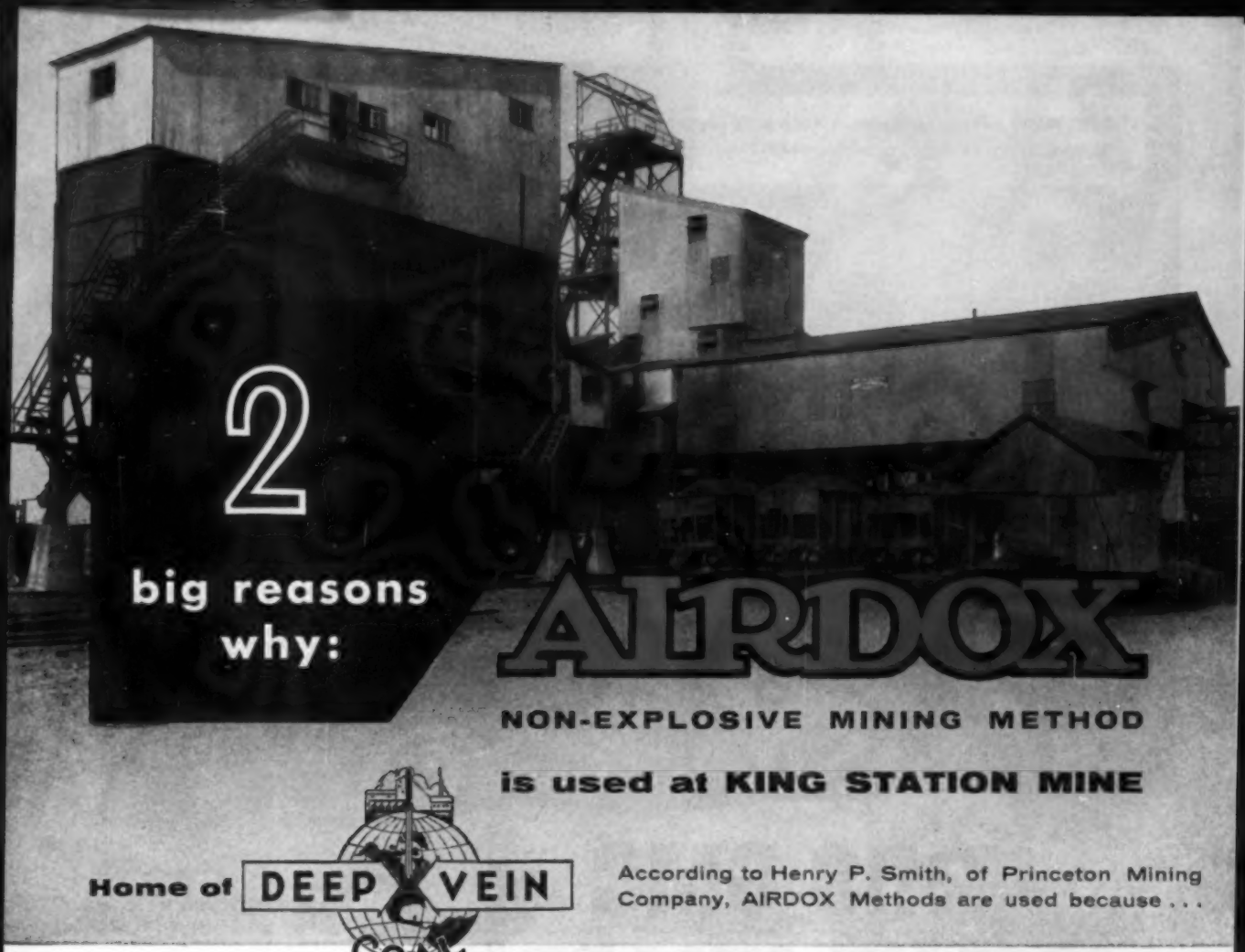

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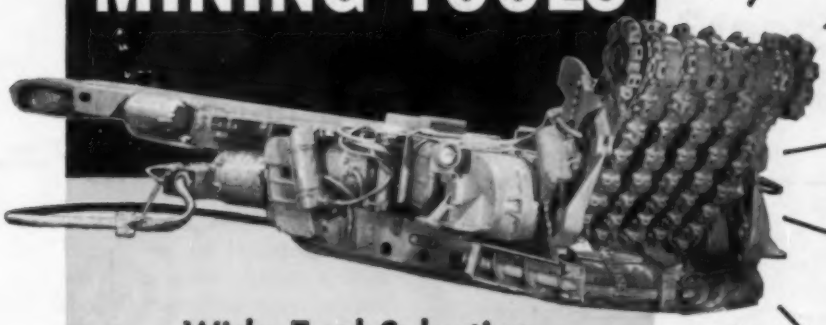

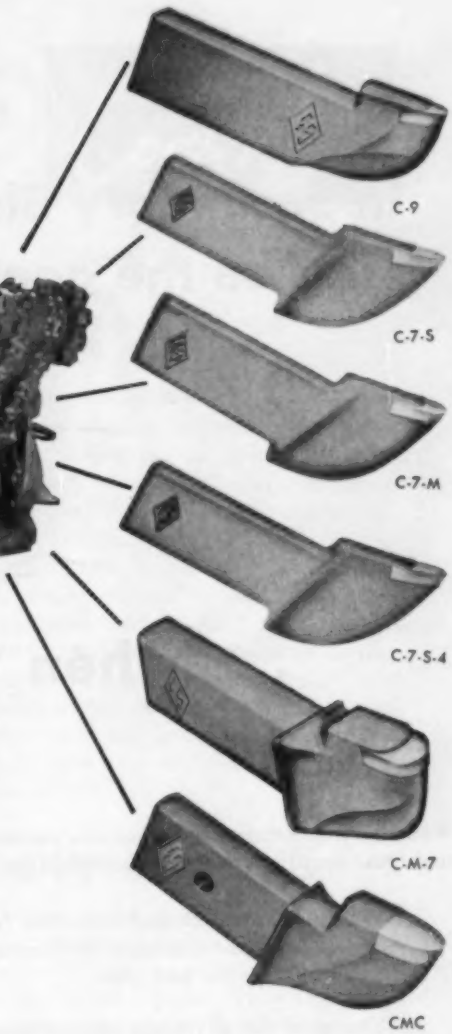

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C-7-S-4 C-7-M C-M-7	C-M-7 CMC	HEAVY	Large Quantities Clay Sulphur Rock, etc.	½" x 1"

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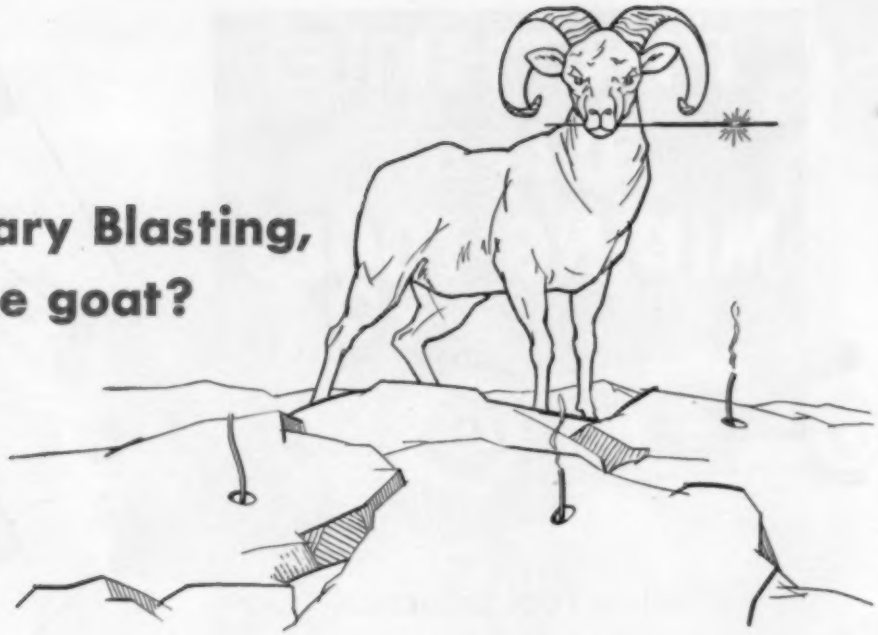
In Secondary Blasting, why be the goat?



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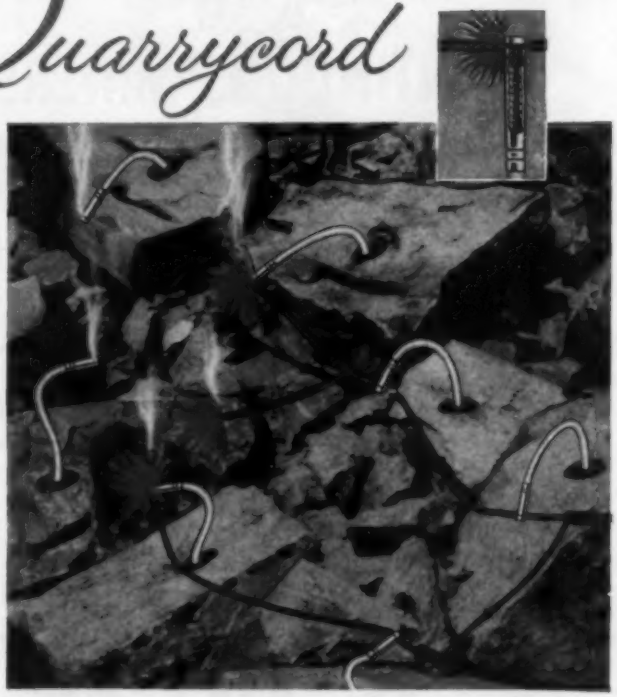

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

NOVEMBER, 1957

IVAN A. GIVEN, EDITOR

And Service

FOR SOME TIME it has been no secret that the course of business in the United States has been more sideways than up. Thus, even though there has been no loss of ground, the change in climate has intensified a few stresses and strains. Consumers, for example, are not holding still for price increases the way they used to. At the same time labor and other costs are moving up. Thus a price squeeze has developed for many concerns in many industries, bringing the usual consequences in its train.

There is general agreement that we should be off the plateau and climbing again not later than the last half of 1958. But in the meantime, coal, as well as other suppliers of fuel and materials to the manufacturing and processing industries, must cope not only with their own cost-increase problems but with pressure from customers experiencing in turn pressures from their customers. Also, though by no means a certainty yet, coal could experience additional competitive pressure from backed-up supplies of petroleum products resulting from a failure to achieve the usual gains in 1957. So coal may have to operate in a somewhat different climate in the months immediately ahead. One of its best weapons will be increased skill in, and greater concentration on, market promotion, advertising, salesmanship and service.

Pressing Decision

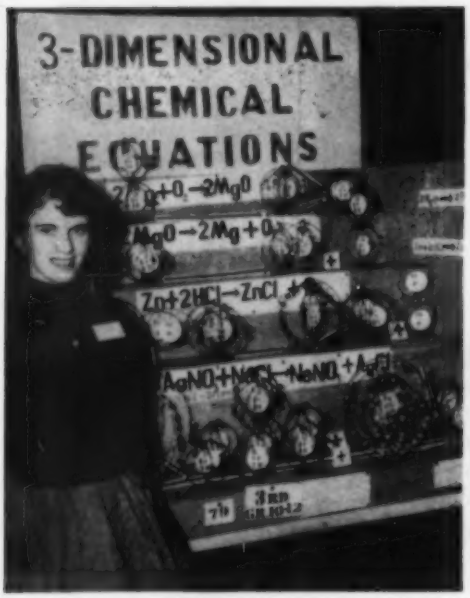
THE RACE to build supertankers continues. One speculation it leads to is where they will dump the oil or oil products they are built to carry. The answer to the destination of a lot of it is not far to seek: the United States. This is true even though added pressure is exerted to build up markets in other countries because the new tankers will join the already considerable fleet in the near future while the markets abroad will be slower to develop to the point where they will absorb the added delivery capacity.

The continued tanker expansion, and the acceleration of the drive to develop foreign fields, are, in fact, pretty good evidence that a fair number of people expect an increase in imports into the United States in spite of the "voluntary" curbs now sponsored by the administration. So, what will the future hold? Perhaps mandatory controls and quotas, and perhaps not, in spite of the need for restrictions in the national interest. The problem is no small one and the solution will not be easily come by, which is one reason why coal must continue to press for a decision that will leave the Nation in a position of strength.

Capacity Benefits

BEFORE LONG a fair number of new mines, along with expansions at existing properties, are going to contribute to a material increase in bituminous productive capacity. They represent a sizeable investment and will help effect a significant rise in tons per man, still the key factor in cost. These capacity increases, and others to come, could throw a lot of stresses into the bituminous fabric if demand fails to grow sufficiently to absorb the added tonnage that will result. There is every reason, however, to contend that even if the increase is not automatic the potential is worth tooling up for.

Energy use in the United States, among other things, should increase at a rate equivalent to 30 to 40 million tons of coal a year for the next quarter century or so. This is merely the average, with no provision for possible acceleration to support a faster rise in the living standard. A lot of the increase is not for coal since it so far is not a replacement for liquid fuels. But what remains is substantial, and coal, if it plays its cost, quality and merchandising cards right, can expect to come up with the lion's share. Capacity to provide an assured supply is a powerful sales weapon, especially when that capacity contributes to an even more potent inducement—lowest possible cost per million Btu.



Training Tomorrow's Personnel

Here is a first-hand report on what the Pocahontas Industrial Council for Education is doing to whet youthful appetites for careers in engineering and the vocational trades. Possible outgrowth for coal: a pattern of industry-wide action.

By W. A. Raleigh, Jr.
Assistant Editor, COAL AGE

COAL EXECUTIVES, for many years, have talked about and wrestled with what many consider one of their toughest problems: How to supply the growing needs for engineers and technically trained personnel. Now, from the heart of one of the Nation's biggest coal-producing areas, comes a five-point plan which may well set a pattern for industry-wide action.

The area, centered around Bluefield, W. Va., comprises five counties —Mercer, McDowell and Wyoming in southern West Virginia; Tazewell and Bland in northwest Virginia.

The plan took shape in the formation of the five county-, industry- and school-backed Pocahontas Industrial Council for Education. Officially launched in September 1956, PICE aims to:

- **Make** the general public, especially high school parents, aware of the area's shortage of technical skills through newspaper and magazine articles, radio and television programs.
- **Encourage** young boys and girls to think along engineering and mechanical lines by getting them to compete in science fairs.
- **Acquaint** high school students and their parents with the engineer's job by having professional engineers talk to school and community groups, and by organizing junior engineer clubs.
- **Work** with high school authorities for greater emphasis on math and science in high school curricula, and for a more adequate supply of qualified teachers and guidance counsellors.
- **Cooperate** with vocational school officials in expanding their staffs and facilities to cope with the area's need for skilled tradesmen.

PICE realizes its plan is neither a panacea nor an "overnight" solution to the problem of technical manpower shortages. But the group is firmly convinced that its efforts will reach out in well-rounded fashion to get at the core of what makes the problem tough: School systems are not generally geared to turn out an adequate supply of boys and girls properly grounded in subjects basic to engineering and technical jobs.

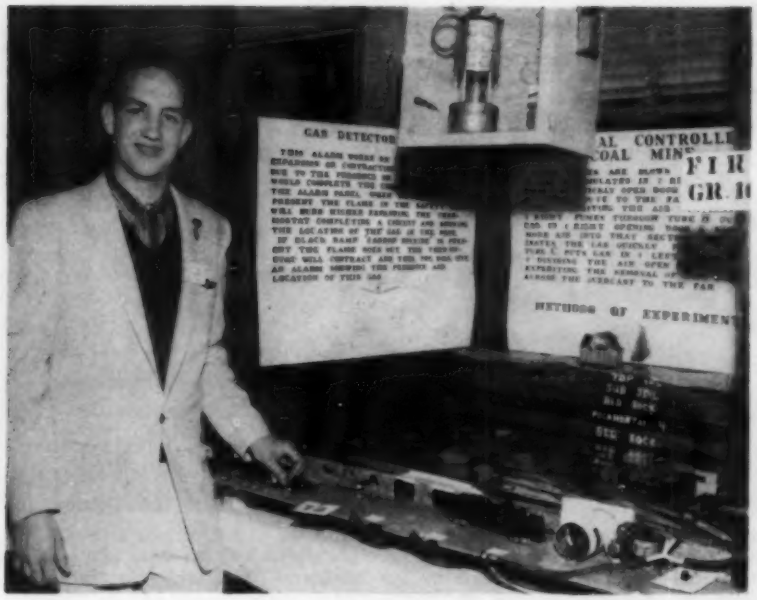
In seeking a solution to this apparently formidable problem, PICE found its clues—paradoxically enough —in the obvious.

Clue No. 1 was to arouse the interest and seek the cooperation of those most directly involved in the solution — parents, youngsters and school officials.

Clue No. 2 was to sell the entire business community on the need for group action. Although PICE's five-county operational area is based primarily on coal mining, numerous other related industries — railroads, electric utilities, wholesale supply houses, banks, etc.—have an equally important stake in the personnel problems.

Pursuit of both clues has borne out the fondest expectations. Some 40 organizations, representing the area's business, industrial and school interests, have joined up to implement PICE's program.

School authorities have given their "whole-hearted cooperation," reports W. A. Fullarton, chairman of PICE's Steering Committee. They are "tickled pink" that business and industry are helping them to do a better job. In fact, Mr. Fullarton adds, many school officials have said they would like to



ANNUAL SCIENCE FAIRS in five counties are PICE's "most ambitious project." Last spring, more than 500 young men and women displayed model or inventive-type exhibits. . .

AMONG THE WINNERS, Pat Slade (far left), Princeton High School; Walter Thornsbury (center), Beaver High School. Richard A. Wolfe (left), Sophia High School, took top regional award. He was sent to the National Science Fair at Los Angeles where his entry placed fourth in the boys' physical sciences division . . .

AWARD RIBBONS (*below*) and medals gave all winners a sense of achievement. . .

CERTIFICATES OF PARTICIPATION and name tags gave all entrants the feeling of "belonging."

—Today

see PICE become a permanent link between the area's business and school interests.

Inherently, PICE's plan is a long-range effort and it would be premature to evaluate its effect on the flow of qualified youths into the area's business and industrial establishments. But by welding all interested parties into an integrated partnership, PICE looks for steady improvement in breaking the bottleneck of technical manpower shortages. And in little more than a year of operation with a budget of about $5,000, the group can point to these initial achievements:

"At least two county school systems have upgraded their requirements in mathematics and science and their requirements for graduation.

"One vocational school has announced plans to require prospective students to take a summer orientation course and to undergo tests for the purpose of screening and selecting their student body.

"An increased awareness of opportunities in engineering and scientific careers is apparent among high school students, their parents and the general public.

"School records, when tabulated, are expected to show more youngsters enrolled in math and science courses this fall.

"Teachers have expressed consider-

1957 County Science Fair

CERTIFICATE OF PARTICIPATION

Awarded by the Pocahontas Council for Industrial Education

to

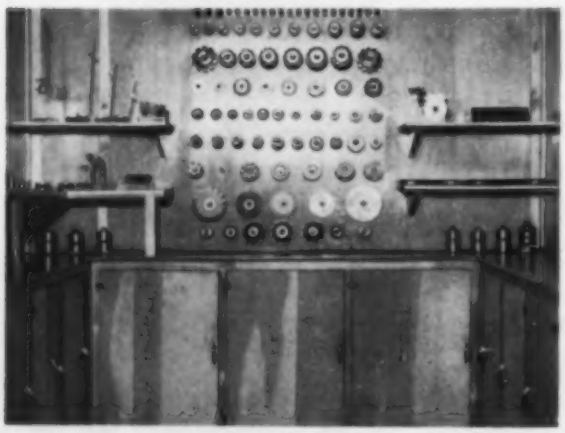
in recognition of outstanding effort and achievement in the advancement of Science

County Science Fair Chairman — President P. C. I. E. — Science Fair Chairman, P. C. I. E.

WELDING DEPT. GRADUATES, certified by the West Virginia Dept. of Labor, are qualified to accept jobs as welder mechanics in mine shops. Each year, competition is keen for scholarships which permit three top-ranking seniors to take advanced welding at Hobart School, Troy, Ohio. Scholarships are sponsored by the Pocahontas Welding Supply Co.

McDowell County Vocational School—Training Ground for Skilled Tradesmen

ELECTRONICS CLASS gets instruction in slide-rule usage. Note working model of television set (arrow) constructed as teaching aid.



TIDY HOUSEKEEPING, the school believes, is basic to proper attitudes and top performance on the job.

THE POCAHONTAS COAL FIELD AREA will require 5 to 10 skilled workers for every engineer . . .

Facing this fact, PICE took a serious look at the three vocational schools in its five-county area. The basic finding: all are short on staff and facilities but each, properly supported, could do a yeoman job in filling future needs for skilled workers.

Pictured on this page are some activities of one of these schools—the McDowell County Vocational School, Welch, W. Va. Here, PICE men are convinced, there is ample evidence to squelch the common belief that vocational schools are "dumping grounds" for high-school misfits.

Current enrollment of the school is 300. All candidates are carefully screened through aptitude and intelligence tests. As a result, some 50 to 75 boys are turned away each year. Those accepted spend the first 9 wk of a 3 yr course rotating to all departments. After this orientation, each student selects his specialty which he practices for half of the school day. The other half he studies academic subjects at the high school.

Students accepted usually do not plan on going to college. Worth noting, however, many parents with college-bound sons now insist that they stay in the McDowell County Vocational School because of the fine foundation it provides for engineering.

Most impressive throughout the school: the serious approach both students and teachers have toward their work, and the extreme neatness of all departments. These include plumbing, electricity, drafting, general sheet metal practice, mill and cabinet, electronics, auto mechanics, combination welding and mechanics, and machine shop.

The trim look and spirit of the McDowell County Vocational School is no accident. Behind its management is Okey E. McCourt—a man who fully understands his responsibilities to the youth and industry of the area.

Okey McCourt is also quick to grasp opportunities when they can upgrade the welfare of his school. He is particularly proud, for example, of the fine stock of metal, lumber and tools which he has been able to pick up at government surplus sales—stock that might otherwise be beyond his modest materials budget.

High on Mr. McCourt's agenda are plans to set up mine maintenance and refrigeration departments. The bugaboo here is procuring qualified teachers. Prospects must have at least 6 yr of practical experience in the trade. Anybody want a job with a first-rate outfit?

able interest in expanding their testing and guidance work when an IBM scoring machine, due for delivery this fall, is made available."

However impressive these achievements, perhaps more significant at this stage is how the idea for PICE was formed, developed, and translated into a working program.

Developing the Idea

The Pocahontas Operators Association—representing certain regional coal producers—took the lead in setting up the Pocahontas Industrial Council for Education. From the very start, however, the movement has had the complete cooperation of public school officials, business concerns, such as banks and wholesale supply houses, and allied industries such as railroads and public utilities.

Taking up the lead for the POA was A. R. Matthews, then president, Pocahontas Fuel Co. Inc., and now president of its parent company Pittsburgh Consolidation Coal Co.

Early in 1956, when setting up six 4-yr regional engineering scholarships at West Virginia University, Lehigh University and Virginia Polytechnic Institute, Mr. Matthews pondered the question: What else can be done to encourage high school kids to embark on engineering careers? Scholarships, he figured, have a very definite place in long-range personnel recruitment. But something must be done to broaden the base of recruit supply if future needs for engineering and technical skills are to be met. In short, this meant arousing deeper enthusiasm for the technical professions in high- and junior-high school systems.

First step was to invite the five county school superintendents for lunch and an informal discussion of plans. At this meeting, special effort was made to uproot prejudices against coal. Many parents still presented coal mining to their kids an an unattractive profession—a boom or bust business, unsafe and plagued with labor problems. Now, the superintendents were told, coal is a growth industry, enjoys labor peace, offers good wages, and has done much to improve its safety record. Further, they were advised that coal's future growth would require many more engineers and technically trained men.

Main outcome of this session was agreement to hold similar meetings—one in each of the five counties—with school principals and math and science teachers. Also, a campaign was begun to interest all other coal companies and related industries in attending the meetings.

For a final roundup of suggestions, comments and plans, Roland Luther, chairman, POA's Vocational Education Committee, called a meeting Aug. 21, 1956, in the association's offices, Bluefield W. Va. About 40 organizations, representing business, industrial and school interests in the five-county area, responded to the call. Attendance included officials from West Virginia University and Virginia Polytechnic Institute, who were invited in an advisory capacity.

The five - county group recommended a steering committee which was subsequently formed, with 12 members, chairmanned by W. A. Fullarton, special assistant to Mr. Matthews. The committee's jobs were to screen suggestions, formulate a program and define policies.

After screening the many suggestions made at the Aug. 21 and previous meetings, the steering committee decided to build its program around five lines of activity each, handled by a separate committee. Those activities involve:

1. Public relations.
2. Science fairs.
3. Engineer speakers and advisors.
4. School curricula, teacher and guidance problems.
5. Vocational schools.

Implementing the Program

Public Relations—Primarily through newspaper articles, radio and television programs, PICE's Public Relations Committee takes the story of technical manpower shortages to the general public and to parents of high school youngsters in particular.

These articles and programs stress the abundance of regional employment opportunities, advise on college entrance requirements, and present data on scholarships and other financial aid available to young people interested in science and engineering. Taking advantage of regional job opportunities, it is pointed out, obviates the need of moving to distant cities.

From the outset, the public relations committee realized it must reach as far down into the lower grades as possible to instill the spark of desire for the engineering profession. Accordingly, news releases have been sent regularly to all high school papers in the Mercer-McDowell-Wyoming-Tazewell-Bland area.

Science Fairs—The public relations committee also has the duty of publicizing activities of PICE's other four committees. The biggest job here is for the Science Fair Committee which organizes five county science fairs each spring. The council says these fairs are "by far the most ambitious project" yet sponsored. They have become key tools for arousing the interest of elementary and high school pupils, their parents and teachers in science and engineering subjects.

The five county fairs held last spring averaged turnouts of more than 100 exhibitors apiece. Much of the fine turnout stemmed from frequent meetings which the science fair committee held with school principals and teachers to plan exhibits.

Most helpful in planning work were three handbooks prepared by the American Museum of Atomic Energy, Oak Ridge, Tenn.: "A Manual for Science Fairs" "Science Fair Handbook for Teachers" and "Science Fair Handbook for Exhibitors."

Cost of the five county fairs was "very nominal", the council states. Purchases consisted mostly of handbooks and other literature, award medals and ribbons, and certificates of participation. Judges, some of whom were provided by PICE, contributed their time at no charge.

Boy and girl winners of the five county fairs in 1957 competed in regional science fairs for the right to go to the National Science Fair in Los Angeles. One of the regional fairs was held at Bluefield State College, W. Va. for Wyoming, Mercer and McDowell counties; the other at Roanoke College, Salem, Va., for Tazewell and Bland counties. Regional fair winners and their teachers were sent to Los Angeles at PICE expense.

The next round of fairs comes up in the spring of 1958. At this time, too, the council plans to set up a model exhibit competition—probably for cash awards—at the Southern Appalachian Industrial Exhibit (Bluefield Coal Show), May 22-23.

Engineer Speakers and Advisors—PICE is convinced that no one can give better talks about the engineer's profession than an engineer. The council has, therefore, assigned this specialized public relations function to the Southeast Chapter of the West

Training Forum: The Pocahontas Community Speaks

REPRESENTATIVES from 39 school, college and business organizations met in Bluefield, W. Va., Aug. 21, 1956, under the auspices of the Vocational Education Committee of the Pocahontas Operators Association. A lively forum discussion ensued on how to develop the interest of high school students in engineering careers or vocational training. Subsequently, the Pocahontas Industrial Council for Education was formed. Comments and suggestions, made at this historic meeting, included the following:

1. Scholarships available for mining and other engineering students should be publicized more in schools, as well as in advertising media.

2. Students should be informed that if they get into a branch of engineering which loses appeal after starting, they can always change to something else.

3. A campaign should be started to advise prospective coal mining engineers that the future for young executives in coal mining is as bright, or brighter, than any other branch of engineering. Starting salaries are high and advancement is rapid.

4. Far too many students graduate from high school with insufficient math and science to take college engineering. All high schools should offer 4 yr in math and 4 yr in science. Until this is accomplished, it would help if our high schools would offer summer courses in plane and solid geometry and science. This service is not being offered now.

5. A smaller scholarship, as, for example, a $300 scholarship, has as much appeal and advertising value as a larger one.

6. Efforts should be made to encourage miners to interest their sons in preparing for mining careers.

7. Schools do not have qualified teachers and the low salaries offered makes it almost impossible to get them. Industry could help overcome this problem, perhaps, by giving teachers employment during the summer school vacation.

8. Not all students are qualified to study engineering. Ways should be developed to select those qualified and guide them into engineering.

9. There should be more cooperative classes which would make it possible for engineering students to alternate months of college and work until graduation.

10. Professional engineers should be sent into schools to talk about engineering to the students and inform them of the various kinds of engineers, how they can prepare themselves for engineering study, etc. Such talks should be made to small groups so that prospects may enter into the discussion and ask necessary questions.

11. There is not sufficient guidance counselling in the schools. Industry should urge the school boards to furnish counselors to guide the students into fields of study best suited to the individual. It might be well worthwhile for industry to furnish such counselors in schools where the school boards are not financially able to do it.

12. There are bright possibilities for engineering students from the vocational schools.

13. There is a shortage of equipment, drawings, wiring panels, and such in the vocational schools. As a result, students are unable to familiarize themselves with the various mining machines which they will be expected to operate and repair when they go to work.

14. There is not enough room in the vocational schools for all of the students who want to enter. For every one taken there are about five who cannot get in for lack of teachers, equipment and room.

15. Russia graduates three or four engineers to every one in the United States. Thus from a defense standpoint, engineers become more and more important as time goes on.

16. "Career days," science fairs, junior engineers clubs, etc., should be used to stimulate interest in engineering study.

17. Engineers advance into executive and administrative positions so fast that, perhaps, they should be taught some business administration to equip them for executive positions.

18. Some companies may keep engineers too long at menial jobs before they are put to engineering work.

19. A brochure describing the work of the various kinds of engineers—and possibly a film—should be prepared and distributed to students.

Virginia Society of Professional Engineers. A speakers' bureau was set up among its membership to spread the story of career possibilities in engineering and related skills.

From its headquarters at Bluefield, W. Va., the engineers' society is making a special effort to send engineer speakers to parent and school groups in the surrounding five-county area. Many talks have been presented to such organizations as Kiwanis, Rotary and Junior Chamber of Commerce. Speakers are reported much in demand.

Along with its speakers' bureau assignment, the engineers' society has also taken on the job of organizing "Future Engineers of America" clubs in high schools. Some four or five clubs have already been set up, patterned after the highly successful junior engineer clubs—the JETS—originated in 1950 by Lorin G. Miller, then dean of engineering, Michigan State College.

Basic purpose of the clubs is to give kids an opportunity to learn what an engineer does and has to know. The purpose is brought down to earth through work projects, discussion, films, field trips to industrial plants, etc.

Curriculum, Guidance and Teachers—Under this heading, a committee is tackling three of the council's most important jobs, which are:

1. To see that high- and junior high-school curricula offers courses basic to engineering and science.

2. To aid in improving the supply of math and science teachers.

3. To expand testing and guidance counselling in schools.

Problems 1 and 2, in large measure, go hand-in-hand. Once school authorities are convinced of the need for math and science courses they will put more emphasis on hiring capable teachers. In recent years, there has been too much tendency to deemphasize math and science courses because of the lack of student interest.

Convincing school authorities, of course, is not the whole story. Getting qualified teachers is always a big headache. Toward this end the committee is studying the problems of teacher supply, teachers' salaries, standards of certification, and related problems of state and federal financial aid.

The expansion of guidance and counselling work is also a critical need for PICE's program. Since all youngsters are not adaptable to engineering and science careers, proper screening of candidates is vital.

Much concerned about the existing supply of guidance counsellors, the committee held several conferences with local school officials and with authorities at West Virginia University and Virginia Polytechnic Institute. As a result, a summer instruction program was set up by West Virginia University "so teachers from the area's schools could begin to get or could continue their training in guidance work."

The summer guidance program offers two 6-wk 3-hr courses in July and August. One course teaches basic guidance; the other, personal inventory techniques. Credit for the courses may be applied toward master's degrees, counsellor certificates and certificate renewals.

Initial enthusiasm for the guidance courses has been most encouraging. The evidence: 20 teachers enrolled for the first sessions held this past summer.

To encourage further teacher interest in counselling, an IBM scoring machine, due for delivery this fall, will be made available to simplify the arduous, time-consuming task of scoring tests. The council feels that usage of the machine by all five counties will certainly be adequate to justify the $50-per-mo leasing costs.

Vocational Schools—In striving for a well-rounded program, PICE had to take serious note of this fact: The increasing mechanization of coal mines and the growth of related industries in the Pocahontas coal field area will require 5 to 10 skilled workers for every engineer. Thus, formation of the Vocational School Committee became a basic necessity. Its job: to improve the area's supply of skilled electricians, mechanics, shop men, etc.

Three of the five counties in the Pocahontas coal field area have vocational schools. All, however, are short on staff and space to meet the growing needs of the area's industries. In attacking the problems, the Vocational School Committee decided first to survey the area's industry to find out what skills were most in demand.

Preliminary survey results showed the area would need the following total numbers of skilled tradesmen for replacement and expansion: In 1957, 177; in the 2 yr, 1957-58, 275; and in the 5 yr, 1957-61, 558. Over the 5-yr period, the area reported its vocational school graduate needs in this order (with the first eight classifications accounting for about three-fourths of total needs):

1. Electricity.
2. Welding and cutting.
3. Machine operation and maintenance.
4. Mine maintenance.
5. Hydraulics.
6. Machine shop.
7. Auto mechanics.
8. Carpentry.
9. Body and fender repair.
10. Plumbing and pipe fitting.
11. Mill and cabinet.
12. Drafting-blueprint.
13. Refrigeration and air-conditioning.
14. Television service.
15. Diesel mechanics.
16. Sheet metal.
17. Masonry.
18. Electronics.
19. Painting.

Final results of the survey are expected to be invaluable in shaping the curricula of the area's three vocational schools. No doubt they will also figure importantly in planning staff and facilities expansion.

Youth Training: A Cooperative Problem

These outstanding facts emerge from PICE's successful experience in setting up a workable program to mobilize youth for coal:

1. Training tomorrow's engineers and skilled workers is a cooperative problem that must be attacked jointly by industry, schools and parents.

2. By accepting the problem for what it is, complexities become less complex and paths of action open up.

In getting its program off the ground, PICE attributes much of its success to the splendid cooperation shown by school authorities in working with the industrialists. No one sought to place blame for the technical manpower shortage. The school officials were told: "The schools are not on trial—this is a matter of trying to help . . .

"Industry has not made much effort; the problem has been left to the schools. It is not completely a school or industry problem—it is a cooperative problem. This meeting (Aug. 21, 1956) is to pose the problem which at long last industry realizes it must help solve. We must arrive at specific steps to alleviate this need. We must, I hope, work out the problem as expeditiously and promptly as possible."

Backing PICE . . .

Coal Mining
American Coal Co.
Pocahontas Operators Association
Peerless Coal & Coke Co.
Pocahontas Fuel Co., Inc.
Island Creek Coal Co.
Semet-Solvay Div., Allied Chemical & Dye Corp.
U. S. Steel Corp.

Schools and Colleges
McDowell County Schools
Wyoming County Schools
Mercer County Schools
Tazewell County Schools
Bland County Schools
Mercer County Vocational School
McDowell County Vocational School
Wyoming County Vocational School
Graham High School
West Virginia University
Virginia Polytechnic Institute
Bluefield College

Business and Industry
Appalachian Electric Power Co.
Norfolk & Western Railway Co.
Virginian Railway Co.
Pocahontas Welding Supply Co.
Bluefield Supply Co.
Bluefield Hardware Co.
National Electric Coil Co.
Rish Equipment Co.
Superior Sterling Co.
Coppinger Machinery Service
Southern Oxygen Co.
West Virginia Armature Co.
Westinghouse Electric Co.
Joy Manufacturing Co.
Kanawha Manufacturing Co.
Pocahontas Land Corp.
First National Bank
Flat Top National Bank
Society of Professional Engineers
Sunset News
Princeton Chamber of Commerce
Welch Chamber of Commerce
Bluefield Chamber of Commerce

Guiding Its Work . . .

Steering
W. A. Fullarton, chairman
Roland C. Luther, co-chairman
Charles McD. Harrell
John E. Osmanski
W. C. Jordan
J. W. Compton
Carl H. Brunner
C. P. Blair
Okey McCourt
G. R. Spindler
Jesse W. Morgan
Filmore McPherson

Public Relations
H. Edward Steele, chairman

Science Fairs
J. E. McCoy, chairman

Curriculum, Guidance, and Teacher Problems
Filmore McPherson, chairman

Speakers and Advisory
J. W. Compton, chairman
Cooperating member, S. E. Chap. W. Va. Society of Professional Engineers.

Vocational Schools
R. J. Cousins, chairman

HAULAGEWAY WIDENING is key to higher efficiency with new equipment. Size of the original opening, which has been brushed and bolted, is shown at left. Widening includes ripping down 1 to 3 ft of top rock after coal has been removed.

How Kaiser Is Rebuilding Koehler For Continuous Mining

PICKUP LOADER discharges to original 2½-ton steel cars. War-surplus landing mats supplement bolts where roof conditions warrant.

To permit higher output and continuous mining with 15-ton cars for transportation, a 7-mi haulage widening and modernization program is now in progress at the Koehler (N.M.) property of the Kaiser Steel Corp. Other steps include new outside dump and relocation of washing plant.

By W. K. DENNISON, JR.
Superintendent, Koehler mine, Kaiser Steel Corp., Raton, N. M.

TO BRING STEEL PRODUCTION more in line with consumer demand in the West, the Fontana, Calif., plant of the Kaiser Steel Corp. is in the initial phase of a $194,000,000 expansion program. This is believed to be the largest single industrial expansion ever to take place in the West. The increase in steel capacity requires, of course, a parallel increase in the facilities for producing the necessary raw materials. This has resulted, among other things, in rebuilding of the Koehler mine, near Raton, N. M., including an entry-widening project now going on, new haulage facilities, relocation and enlargement of the preparation facilities and the installation of new-type continuous miners for efficient low-cost production.

Consumption of steel in the seven western states has increased from 4 to 6½ million tons in the last 10 yr. Results of exhaustive studies indicate that western steel consumption should be at least 7 3/4 million tons by 1960 and 10 million by 1965.

National per capita consumption of steel in 1956 was 946 lb. Per capita consumption in the West for the same period was 648 lb. As western industrial centers mature and develop a higher percentage of heavy industry and production-line manufacturing, it is natural to expect western steel consumption to increase to near national levels.

Included in the Kaiser expansion program is the construction of a fourth blast furnace scheduled for operation in April, 1958, which will increase the hot-metal production of the plant by 40%. The addition of this furnace requires a comparable increase in the output of the raw materials necessary to the production of pig iron.

Kaiser in New Mexico

Sixty percent of the added coal requirements will come from the Koehler mine, near Raton, N. M. This mine is part of the New Mexico holdings of the Kaiser Steel Corp., which contain vast reserves of coking coal.

These coal properties are in Colfax County, New Mexico, and were acquired by the Kaiser Steel Corp. in August, 1955. They comprise 202,000 acres of fee land along with an additional 328,000 acres of coal

POST-WIDENING APPEARANCE where the height permitted retaining original bars by bolting. Bolts and landing mats support the widened area.

BOTTOM BRUSHING was necessary in only one section with badly broken top. Difference in track elevations illustrates how height was increased.

MOVING DAY for a vibrating feeder in the old washing plant, to be erected at the new dumping site and increased in capacity.

rights. At the time of acquisition, there was one operating mine on the property, located at Koehler, N. M., 23 mi southwest of Raton in Colfax County.

Koehler mine was originally opened in 1907 and was operated until 1923, at which time it was closed down. A maintenance crew was kept at the site and the mine was reopened in 1942. It has been in more or less continuous operation, at varying tonnages, since that time. Peak production for any one year was 750,000 tons.

Operations are in the Raton seam in the Vermejo Formation, which is of Cretaceous origin. Average seam thickness at this location is 6 ft. The product is a high volatile "C" bituminous coking coal, producing a metallurgical coke of very good quality. The seam is comparatively flat, with a slight dip in a northwesterly direction, and outcrops to the surface in the escarpments that form the canyon walls in the area. This makes possible the exploitation of the seam by drift openings driven in from the outcrop.

Recoverable reserves at Koehler are estimated at 10,000,000 tons.

The Kaiser expansion program, as it affects its New Mexico operations, can be divided into two parts:

1. An exploration program to find areas of high-quality coking coal for future use.

2. Rehabilitation and modernization of underground and surface installations, with subsequent increase in coal production, at the Koehler mine.

Considering the extent of total acreage of fee land and coal rights, very little exploration work has been done on this property. However, at the present time, three core drilling rigs are engaged in an exploration program in the Castle Rock Park area, approximately 36 mi west of Raton. The geometric center of the area under consideration is 8 mi south of the Colorado-New Mexico line and 10 to 12 mi east of the Sangre de Cristo Range.

The original drilling program, which began in June, 1956, had as its objective blocking out enough coal for a single mine with daily production of approximately 4,000 tons. However, as drilling progressed, results were so encouraging that it was decided to determine the full extent of the Castle Rock coal lens and, in particular, find the location of the best quality reserves. This project is still in progress and, to date, indications are that there are sufficient coal reserves to support three large tonnage mines.

There are two major seams in this area. One is the Raton, which is 20 to 40 ft above the Trinidad sandstone and is the same seam mined at Koehler. The other is the Vermejo seam, which usually occurs 220 to 260 above the Raton. Both seams are in the Vermejo Formation, with the Raton or lower seam being the more consistent throughout the area.

Quantity samples for oven testing were obtained from two widely separated holes by deflecting from the vertical hole to obtain additional coal cores. Extensive oven tests and laboratory work on these samples have proved this to be a very good quality bituminous coking coal.

The trend of the dip in this field is in a southeasterly direction and generally does not exceed 3%. Cover over the main, or lower, seam will vary from 700 to 2,300 ft. The coal being considered for first mining lies from 1,000 to 1,800 ft deep.

The Koehler Program

Since one of the goals in underground operations at Koehler mine is high efficiency with modern equipment, some changes were necessary to make it possible both to introduce the equipment and to clear the way for capacity operation. The major roadblock was the main haulage-way which, though in good condition because of good barrier pillars and careful timbering, was too narrow and too low for the big cars, continuous miners and other equipment scheduled to handle the production load.

The old haulage openings were 5½ to 6 ft high and 7 to 10 ft wide. To permit using 15-ton cars and other high-capacity equipment they are being widened to 14 ft and roof is being taken to assure at least 6½ ft of clearance over the rails, with the exception of the one section being bottom-brushed because of broken roof that would have involved a major excavation job.

Approximately 7 mi of haulageway will be widened and renovated, half of which will be main line to the new working sections. All of these new sections are approximately 3 mi from the portal. To the end of September, 9,500 ft of the main line had been widened from the portal in to accommodate the larger cars.

The widening unit consists of a 550-v DC 4JCM miner accompanied by an 8BU pickup loader. The original 2½-ton steel cars and battery gathering locomotives are used for haulage, along with the original main-line track. Distance cut per shift varies, depending on the width being taken, but has been averaging 75 ft.

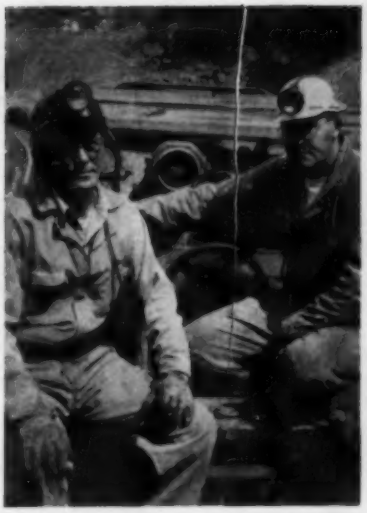
Top over the coal removed for widening is ripped down by the miner to the desired minimum height or slightly more.

Normally, the desired height coincides approximately with a natural parting above which there is a layer of sandy shale which makes an excellent roof. Between this layer and the coal, the usual top is boney coal or shaley bone graduating into sandy shale. However, in one area sandstone comes down to a foot over the coal and there are other variations in the strata.

The widening procedure is substantially as follows:

First, the top in the original entry is brushed by a three-man crew. Two men drill and shoot while the third man, with help as needed, hand loads the rock into cars. The brushing crew usually takes 1 to 3 ft of material—usually to the sandy-shale layer where the natural parting is. Where bolts were installed in past years, the top is brushed as required and rebolted afterward. In timbered areas, the roof is bolted and the timbers are removed. Then the brushing is done and the roof is rebolted at its final height.

The brushing crew is followed by the bolting crew of two men, using stoper equipment. Wedge-type roof bolts 5, 6 and 7 ft long are installed on 5-ft centers, the length being dependent on the distance to the anchoring horizon. In areas where the immediate roof is friable and broken, but where good anchorage can be secured, excellent results are being attained by using war-surplus perforated landing mats in conjunction with roof bolts. These mats are 10 ft long, 15 in wide and 1/8 in thick. Compared to wood cross bars or I-beams, they give superior support



KOEHLER STAFF—J. R. Kastler (left) manager; E. D. Moore, mine engineer; Nickie Yoksich, mine accountant; L. M. Morris, geologist; B. B. Baker Jr., supplyman; W. K. Dennison Jr., superintendent; Steve Starkovich mine foreman.

under Koehler conditions. One advantage is that in blocky, shattered roof the mats can be made to conform to the contour of the roof, resulting in a "keying" effect and good support.

The widening operation follows final bolting of the original entry. The miner handles this by first removing the coal, and then raising the head to rip down the top even with the top in the original entry after bolting. The coal and the top material are segregated in handling by the operator of the pickup loader.

After widening, the top is bolted to extend support all the way across and complete the operation.

Mining and Preparation

When entry widening is completed, the present 60-lb rail will be replaced with 90, using, among other things, creosoted ties made available in the salvaging of the last of the Denver & Rio Grande Western Ry. narrow-gage tracks in Colorado. Grading of the haulageway had been done previously to hold the maximum to 3%—in some instances in favor of and in others against the loads. In view of this situation, about all that will be done will be to provide, where they do not now exist, vertical curves with radiuses of at least 150 ft. Some horizontal curves also must be increased to that figure to accommodate the new cars. Track gage will be increased from 40 to 48 in, and the improvements will result in faster haulage with greater loads.

The present 2½-ton cars will be replaced by 15-ton solid-bottom cars. These cars will have double trucks and will be equipped with automatic couplers and rubber-cushioned draft gear. Overall dimensions are: length, 27½ ft; width, 7½ ft; height over the rail, 4 ft.

Haulage will be handled by new 20-ton trolley-and-cable-reel locomotives. Rated drawbar pull is 10,000 lb at 11 mph, and equipment includes dynamic braking with 32-v battery control.

All face equipment will be AC. When mechanization has been completed, there will be two working sections, each equipped as follows:

2 Joy 6 CM continuous miners. These will be of the so-called Sunnyside design, with a cutting height of 10 ft and a sump of 24 in.

1 Joy 11BU pickup loader.

2 10-ton 10SC shuttle cars.

1 mobile roof-bolting machine.

In the initial stages of production, however, until new equipment can be obtained, production will be obtained from one continuous miner section and three universal cutting machine sections, both utilizing mechanical loaders and shuttle cars for loading purposes. The equipment will come from Kaiser's Sunnyside (Utah) operation.

A new haulageway is to be constructed on the surface from the mine portal to a new rotary dump, which is to be located on the hillside above the present tipple. A level grade will be maintained from portal to dump, a track distance of approximately 1,200 ft. Coal will be fed directly from the dump bin to the washing plant.

The present washing plant is 1 mi from the tipple. Formerly, coal that was to be washed was loaded into railroad cars at the tipple and transported to the washer where it was unloaded for cleaning. This plant is to be dismantled, moved to, and re-erected at a site below and opposite the rotary dump. Coal from the dump will be conveyed directly to the washer and the old raw coal tipple will be entirely eliminated. Capacity of the washer will be increased from 175 to 250 tons of raw coal per hour by adding cells to the Jeffrey wash box. Ultimately, it is planned to add a flotation system along with the necessary thickeners, filters and dryers to clean the 48x250M coal. Clean coal recovery is approximately 75% of raw coal.

When production is resumed, daily output at Koehler will be 2,000 tons of clean coal per day. As new equipment is received, output will be gradually increased to 3,250 tons of clean coal per day.

It is believed that in addition to providing the necessary increase in coking coal to meet present requirements, the combined reserves in this area are sufficient to meet any additional requirements in the foreseeable future.

Inspection Guide For Deep Mine Equipment

Face equipment requires complete and frequent inspections. Although this equipment varies widely in type of work performed, the electrical, mechanical, hydraulic and lubrication principles are much the same.

This is the second of a three-part inspection guide. The first, in the October issue, dealt with substations and electrical systems. The third, to appear in December, will cover haulage and other service equipment.

By Daniel Jackson, Jr.
Assistant Editor, Coal Age

Face Equipment

EQUIPMENT USED at the face varies widely in type of work performed. However, the electrical, mechanical, hydraulical and lubrication principals are very much the same. A great deal of extra attention is necessary because of the stresses and strains inherent in face work, the extra difficulty of servicing the unit, and the opportunities for neglect and abuse. Face equipment in general consists of the following:

1. Roof-bolting machines.
2. Cutting machines.
3. Drilling machines.
4. Loading machines.
5. Continuous mining machines.

These use electricity as their primary energy source, employing it not only for mechanical power but often for hydraulic or pneumatic power in doing their various jobs. Therefore, a complete inspection of face equipment involves the following components:

Electrical.
Hydraulic.
Pneumatic.
Mechanical.
Lubrication.

Electrical Inspection—Electrically, all face equipment is under the same permissibility laws. Design and operating principles also are similar. For this reason, the material which follows will, in most cases, apply to all face equipment.

Motor Maintenance—Periodic load tests should be made to insure against overload, which is the chief cause of motor failure. Every effort should be made to guard against it. Motors on face equipment do a tremendous amount of work. Inspections should be frequent and thorough, once a week is not too often. High temperatures shorten the operating life of electric motors. Frequent thermometer readings should be taken and compared to the nameplate rating. Any causes of overheating should be corrected as soon as possible. Proper care of brushes and brush rigging is essential to good commutation. The check-list below should promote good maintenance.

1. Set brushholder boxes the proper distance from the face of the commutator.
2. Check the brushes for uneven wear, chipped, short and foreign particles lodged in the face of brushes.
3. Align brushes correctly.
4. Test the spring pressure on brushes.
5. Check the brush rigging for neutral point.
6. Look for dirt and oil on brushes or in the brush-boxes.
7. Test the brush grade to make sure it is correct.

Commutators are the most difficult part of a DC motor to maintain. Examine the commutator for the following:

1. High mica.
2. Grooves, burns and flat spots.
3. Mica-V ring for dirt and oil.

Insulation resistance tests should be made of fields and windings to determine their condition. Fields should be checked for looseness. Make sure that field connections are tight and well insulated.

Check armature bands for looseness. Loose bands can cause motor failure. Replace bands that are found to be loose as soon as possible.

Operating Controls—The purpose of operating controls is to apply power to equipment as needed. Controls consist of off-on reset switches, controllers of various types and a variety of switches to control lights, conveyors and pumps. In general controls serve to switch on or cut off power. Since most face equipment today is controlled by magnetically operated contractors, it follows that operating controls also function to supply power to coils which produce the magnetic action. The successful operation of any machine depends on properly maintained controls. Actually, maintenance is not too great since very little current flows through the control circuits. Inspection should include looking for loose connections, faulty wiring and corrosion. Keep operating controls clean.

Contactor Panels—Various types of panels are employed in operating mine equipment. Bear in mind that their functions are the same, i.e., to stop, start and control motors. Panels are equipped with fuses, overload relays, time-delay devices, interlock mechanisms and wiring.

Fuses should be checked for proper rating. Test overload relays, making sure that their rating and operations are correct. Time-delay devices, such

FOREMANS TROUBLE REPORT FORM FOR MECHANICS

To be filled in by Foreman---

SECTION NUMBERS: _____ SHIFT: _____ DATE: _____ FOREMAN: _____

TIME TROUBLE NOTED:	_____ AM	_____ PM
TIME CALLED MECHANIC:	_____ AM	_____ PM
TIME MECHANIC REPORTED TO SECTION:	_____ AM	_____ PM
TIME MECHANIC COMPLETED JOB:	_____ AM	_____ PM
TIME MECHANIC LEFT SECTION:	_____ AM	_____ PM

FOREMANS DIAGNOSIS OF TROUBLE: EQUIPMENT DESCRIPTION: Type: _____ Ser No.: _____

To be filled in by Mechanic---

MECHANICS SIGNATURE: _____

ACTUAL WORK PERFORMED BY MECHANIC:

_____

WAS JOB COMPLETED TO STANDARD? ____ IF NO, STATE REASON WHY AND EXPLAIN WHAT'S REQUIRED:

IMMEDIATELY AFTER MECHANIC HAS COMPLETED JOB HE WILL TURN THIS WORK ORDER OVER TO THE FOREMAN THAT MADE REQUEST. THEN MECHANIC WILL REPORT TO HIS REGULARLY ASSIGNED DUTIES.

NOTE: TO FOREMAN: If above job was not completed to standard the oncoming mechanic must be notified by the above reporting foreman.
This work order to be forwarded to the maintenance superintendent.

CONFIRMING WORK SHEET

MINE: _____ UNIT NO: _____ DEPT. NO: _____ DATE: _____ SHIFT: _____

EQUIPMENT DESCRIPTION: _____ TYPE: _____ MODEL: _____ SER. NO: _____

Description of work done this shift

NOTE: Attach copy of order for supplies to this report

TIME REQUIRED TO DO JOB: From Time: _____ M to Time: _____ M Date: _____

List of Materials used this shift

Quantity	Part No:	Part Description:	New	Old	Price	Total

Equipment Description: _____ Serial Number: _____

Mine: _____ Section: _____ For Month of: _____ 19__

M = MECHANICAL DELAY E = ELECTRICAL DELAY C = CABLE SPLICE

Record of Delays							Production			Cost
Date	Delay Explanation:	From Time	To Time	Total Delay in Minutes M	E	C	Tons Loaded	Tons Hauled	Places Cut	Daily Supply Cost

FOUNDATION OF ANY MAINTENANCE SYSTEM is good reports and records.

Mine No.....

Repairman's Weekly Inspection Report

Loader No. ..... Date ..... Location .....

MOTOR

Brushes and Commutator .....
Holders, Springs and Leads .....
Armature Bearings, Grease .....

CONTROLLER

Fingers and Tension .....
Segments and Cylinder .....
Wiring .....

CIRCUIT BREAKER

Contacts .....
Tripping .....

HYDRAULIC SYSTEM

Control Valve .....
Four Way Valve .....
Pressure Pump .....
Hoses and Connections .....
.....
Fwd. and Reverse Leathers .....
Front Jack Leathers .....
Rear Jack Leathers .....
Swing Cycl. Leathers .....

CLUTCHES

Front Clutch ..... Slipping Amperes .....
Rear Clutch ..... Slipping Amperes .....

CONVEYORS

Rear Chain Tension .....
Front Chain Tension .....
Compound Chain ..... Grease .....
Flights Rear Conveyor .....
Flights Front Conveyor .....

GATHERING HEAD

Seal Packing Rings .....
Grease ..... Dirt .....
Gathering Arms ..... Bolts ..... Bits .....

TRANSMISSION CASES

Grease ..... Leaks .....

CRAWLER DRIVE

Chain Tension ..... Grease .....

SWING ROPES

Ropes and Clamps ..... Sheaves .....
Remarks .....
.....
Coal Drill Inspected .....
Cutting Machine Inspected .....
Repairman ..... Ck. No .....
Helper ..... Ck. No .....
Total Hours .....

INSPECTION REPORTS help by uncovering conditions which might result in breakdown if not attended to in time.

as mercury tubes, should be tested to see that the time sequence is correct and that they function properly.

Interlocking mechanisms are used to keep more than one set of contactors from going in at the same time, which would cause the motor to try to run in both directions. Guard against this by inspecting the interlocks carefully and frequently. Wiring, which is the "blood-stream" of all equipment, suffers from heat, moisture and mechanical damage. Keep wiring away from excessive heat whenever possible. Every effort should be made to keep moisture out of panels boxes. See that wiring is protected from moving parts that could damage the insulation.

The contactors are subject to more wear and damage than any other part of the panel. Frequent and thorough inspections should be made. One thing that contributes to electrical failure of contactors is looseness. Check connections, contacts and assemblies of the complete contactor. Make sure that all wiring connections, and bolts and nuts, are tight. Replace contacts that are worn, burned or pitted. Ribbon-type shunts corrode quickly. Be sure to check and replace those that have corroded excessively. Blowout coils have different current ratings for various motors. Check their rating to be sure that it is correct.

Dust is one of the most destructive agents to electric motors, operating controls and contactors. Manufacturers in most cases have provided protection against dust but the success of this protection depends on its being maintained. Make sure that covers, inspection plates and cable glands are intact. Don't permit dust to accumulate on and around motors. This reduces heat dissipation resulting in overheating.

Trailing Cable—The outer end of the cable should be equipped with a nip and a properly rated fuse. Check. Count the number of splices in the cable and examine their condition for strength and insulation. Make sure that the proper size cable is being used on the equipment. For rated voltage at motor terminals and safe operation the cable should not contain more than six splices. See that cables are not twisted. Twisted cables are easily damaged. Protect cables against damage.

Cable-Reel Collector Rings—Automatic cable spooling equipment should be closely checked. Successful operation of the cable-reel depends largely on maintaining the collector rings. They should be inspected frequently. Once a month is not too often. Look for worn rings, loose connections and faulty insulation. Keep grease and dust out of the collector ring.

Wiring, which supplies power to all parts of the machine, should be well insulated from the frame and from conductors of opposite polarity. All conductors should have current-carrying capacity sufficient for their intended duty. Wiring outside of locked or explosionproof enclosurers should have adequate mechanical protection. Good mechanical protection usually can be achieved by placing them in conduit made of a good grade of rubber air hose. All conduit ends should be clamped to prevent their being pulled out. Make sure that wiring and conduit are fastened solidly to prevent both rubbing against moving parts and vibration. Protect wiring so it cannot be damaged by falling material.

Connection boxes should be used where it is not possible to make a continuous wiring-run between parts. Boxes should be well insulated with suitable connectors for splicing wires. Keep wiring in good condition and all connections well insulated.

Self-propelled machines should be equipped with lights. See that lights are mounted where they will receive maximum protection against damage. Examine light sockets for loose connections. If lighting voltage is reduced through resistance check to see that the resistance is in good condition. Use a voltmeter to check supply voltage. Lights on equipment are for safety. Keep them on.

Hydraulic Inspection — Hydraulic equipment is popular at the face today because (1) it offers positive control, (2) produces motion not easily duplicated by purely mechanical means, (3) can be adapted to all types of machines and (4) can be maintained with relatively less difficulty.

The control and use of hydraulics is very much the same on all machines. This phase of the inspection is in-

tended to apply to all face equipment. Items which should be included in the hydraulic inspection are:

1. Oils.
2. Reservoirs and filters.
3. Hose and fittings.
4. Pumps.
5. Relief valves.
6. Control valves.
7. Motors.

Oils—Hydraulic oil can be an expensive item. This, however, depends on how well the systems are maintained. Most systems do not receive the attention they need. High oil cost and a large turn over of repair parts are the results.

Daily, weekly and monthly inspections are necessary to properly maintain oil. Inspections should be conducted daily to see that the oil is at the proper level in the reservoirs. The grade of oil also should be checked to make certain that the wrong grade has not been added to the system by mistake. Weekly observations should be made to make sure that the oil is handled correctly. Strainers and filler ports also should be inspected weekly. Check oil and reservoirs for impurities once a month.

There are a number of hydraulic oils on the market today. The problem is to select the one that will do the best job at the lowest cost. In most cases the manufacturers' recommendations should be followed. If for any reason the oil now being used is unsatisfactory, consult a lubrication engineer. The company from which oil is purchased will be glad to assist.

A hydraulic system must have sufficient oil in the reservoir before it can function properly. Reservoirs are equipped with a "dip-stick" to gage the oil. Check oil level frequently.

Proper handling of oil at the mine is of the utmost importance. Check to make sure that storage facilities provide protection against dust and water. See that equipment is available to transfer oil from the drums to small containers. Drum openings should be cleaned before oil is extracted. Make sure that containers are clean inside and out before they are filled. Lids and covers should be in good condition to prevent spillage and to keep dust and water out of the oil.

Oil on the section should be stored in a safe place. See that it is located away from moving equipment. Don't permit oil to be stored near the nipping station or power lines. Keep fire extinguishers near the storage place.

Filler ports of reservoirs should be cleaned before oil is added. Clean the space around the port before taking the cap off. Strainers serve to keep dirt out of the reservoirs. Clean strainers at least once a week.

Clean oil and clean reservoir are important to the components of the hydraulic system. Under normal operation the oil and reservoir should be checked once a month. If tests show them to contain excess foreign material the oil should be drained and the system flushed out with clean hydraulic oil. Do not use gasoline, kerosene or chemical solvents.

Test for moisture in the oil. It can be detected by the spongy-like action of the equipment. Oil and water will separate when the equipment is idle for a few hours. It can then be drained at the reservoir without draining the whole system.

Foaming oil indicates air in the system. It can enter the system through faulty connections, damaged hoses or at the pump shaft due to bad packing. If foaming occurs inspect the system for leaks and make necessary repairs. Don't permit foaming to continue for any length of time.

Reservoirs and Filters—Reservoir maintenance is important to a hydraulic system. The main purpose of the reservoir is to supply oil in sufficient quantity and to make sure that the suction port is immersed in oil at all times. The reservoir should be large enought to dissipate heat and to release air that may be in the oil before it is picked up by the pump again. Make sure that the reservoir provides these necessities.

Filters vary in type and style. Their main purpose is to filter the oil before it is pumped into the system. This results in better performance and reduces wear of parts. Periodic inspection and cleaning will prevent clogging which tends to slow down the operation of the machine. Filters clean the oil, mechanics must clean the filters.

Hoses and Fittings—Flexible hose are used throughout on face equipment with only a few exceptions. Flexibility, ease of installation and repairs are the governing factors.

Visual inspections should be made daily. Look for damaged hoses. Make sure that they are well protected against falling material and moving parts. Check hoses that have been in service a long time. They may be at the point of failure due to deterioration. Change hoses that are likely to cause delays. Don't wait until they fail.

Fittings cause very little trouble in hydraulic systems. Leakage and breakage are the two things to look for. Usually, fittings are not tightened properly when they are installed. Breakage results from abuse or inadequate protection. Inspect the system frequently noting any loose connections. Provide better protection for fittings. Curb abuse as much as possible. See that spare hoses and fittings are stored in a clean, dry place.

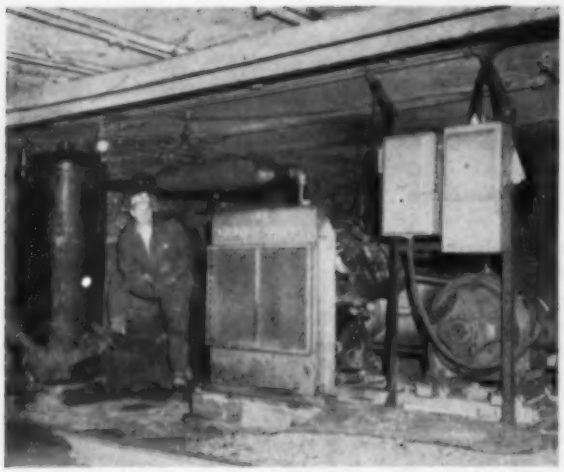
Pumps—There really isn't much to inspect on a pump. It either produces the desired pressure or it is changed out. However, tests should be made to make certain that the pump is really bad. Many good pumps have been changed while the actual trouble was in another part of the system.

The only way to test a pump is to use a good pressure gage. Even before the gage is used a check of the filter, suction hose, connections and relief valve should be made to make sure that they are in good condition and working properly. Install the gage near the pump on the output side. Start the pump and read its pressure. This test will give positive proof as to whether the pump should be changed or not. Keep in mind that low pressure does not necessary mean a bad pump.

Relief Valves—The relief valve serves to regulate the pressure in a hydraulic system. It functions to discharge oil back into the reservoir.

Relief valves give very little trouble but failures do occur. Valves should be checked periodically. Wear and breakage of components, foreign particles that keep the valve from operating and improper adjustment are causes of relief valve trouble. Note any signs of wear at the valve seat, cylinder and wall. Test the spring to make sure that it is not broken. See that valve is clean and free of foreign particles. Make sure that the adjustment is correct. Don't over look the relief valve as a possible source of trouble when a hydraulic system fails.

Control Valves—Control valves are to direct and control hydraulic pressure from the pump to the motors. They require little maintenance. The more common failures are gaskets, oil seals, broken springs and foreign particles in the system. Wear contributes very little trouble but it should be considered. Visual inspections should be made of gaskets and oil seals. Broken springs can be detected by looseness of the control levers. See



STATIONARY AND PORTABLE COMPRESSORS should be installed properly, inspected frequently and kept clean.

that valves are cleaned periodically. Worn parts tend to make the machine sluggish. Valves that are worn should be exchanged and the old one sent off to be rebuilt. Never attempt to repair a worn valve without proper tools.

Motors—Hydraulic motors produce rotary and linear motion. Rotary type motors function similar to that of a pump. Linear type motion is produced by piston jacks.

Motors, like all other hydraulic equipment have practically the same troubles, i.e., gasket and oil seal failure, spring breakage, wear of parts and foreign particles in the system. Motor inspections should be conducted in the same manner as other components of the system.

Don't be hasty when inspecting or trouble-shooting hydraulic systems. Be sure that the parts changed are bad.

Pneumatic Inspection—The most commonly used tools are drills and impact wrenches. Inspections should cover compressors and distribution facilities in addition to utilization of the tools themselves.

Stationary compressors may be located near the portal or in the mine. There are several things to keep in mind on permanent installations. Provide good ventilation for the compressor. If at all possible, locate it where the air will be clean. Foundations should be solid. Keep units bolted.

Portable compressors may be mounted on rubber tires for off-track use or on trucks for track movement. Make sure the compressor is well protected against damage while in transit.

The two types of cooling systems used on compressors are water and air. Good ventilation is important to both. Cooling fins for air-cooled cylinders and water jackets for water-cooled compressors should be kept clean so that heat can dissipate freely. Compressed air can be used to clean the fins. Make sure that cooling system is flushed out periodically.

Safety valves serve two purposes (1) to permit the compressor to unload or idle after the required pressure is reached in the tank and (2) to release excessive pressure if the unloader valve fails to operate.

Test valves frequently to make sure that they are working properly. Keep valves clean and properly adjusted. Heat may damage the valves; if so they should be changed.

Tanks should be equipped with a cutoff valve at each outlet. A drain plug or valve should be located in the bottom of the tank to permit draining.

Compressor lubrication is very important. When selecting an oil, choose one specifically refined for use in air compressors. This oil forms the least possible carbon and sludge. Normally, the manufacturer's recommendations should be followed. The use of an incorrect oil can be detected by the following symptoms: (1) oil consumption too great, (2) excessive carbonization in the air passages and on the discharge valves and (3) sticking valves.

Air filters do one important job: cleaning the air before it enters the compressor. Reduced wear, sludging and greater efficiency are the advantages of supplying clean air.

Dry and oil type filters are used on compressors. Cleanliness is of the utmost importance. The filters should be cleaned frequently. Dry filters should be cleaned with compressed air and then washed in kerosene. Oil type filters also should be cleaned in the same manner with one additional step: change the oil.

Regular compressor inspections can be scheduled by the total hours worked or by the day, week and month. Keep a log to record the inspection. Enter any repairs or changes made and the number of hours worked. The following check list is a guide to good maintenance.

Daily or every 8 hr:

1. Maintain proper oil level.
2. Draw off water which may collect under the lubricating oil.
3. Drain tank of accumulated water.
4. Clean air filters.

Weekly or every 50 hr:

5. Test safety valves.
6. Oil fan and water-pump bearings.

Semi-monthly or every 100 hr:

7. Change oil filters.

Three months or every 500 hr:

8. Change oil.
9. Check cooling system and clean.

Air lines are relatively easy to maintain. Leakage should be kept to a minimum. Make sure that lines are well protected. Pipe lines should have cutoff valves at regular intervals, and should be equipped with water traps to collect and drain water out of the system.

Air hoses should be well protected. Make sure that a line oiler is installed in the line before the tools are connected. The line also should be blown out before connections are made.

Two factors contribute more to

DAILY LUBRICATION

MINE:_____ SECTION NO._____ DATE:_____

LOADER SERIAL NO:_____,_____

Lubrication Points:	Lubricated Yes	Lubricated No	Use Lubricant
1. Frictions RH & LH	☐	☐	Hydl. Oil
2. Gathering Head Gear Case RH & LH	☐	☐	Y
3. Cat Drive Speed Reducer RH & LH	☐	☐	Y
4. Crank Pin Bearing	☐	☐	Z
5. Gear Case Seal	☐	☐	Z
6. Idler Arm	☐	☐	Z
7. Cat Idler RH & LH	☐	☐	Z
8. Conv., Tail Roller	☐	☐	Z
9. Cat Drive Sprocket Bearing RH & LH	☐	☐	Z
10. Conveyor Hinge Pin Upper & Lower	☐	☐	Z
11. Rope Sheaves	☐	☐	Z
12. Conveyor Chain	☐	☐	Hydl. Oil
13. Cat Drive Chain	☐	☐	Hydl. Oil

DUTIES AND RESPONSIBILITIES OF GREASES

1. Properly lubricate all equipment assigned to him.
2. Help float out S/Car crewmen for lunch.
3. Each shift the greaser will clean out the S/Car reel cases and, keep the sheave wheels free of accumulation of obstructive material, also, clean the operators platform and any other accumulation of obstructive material as may be encountered on the wheels and chasis of the shuttle car.
4. Fill to capacity all hydraulic tanks on equipment assigned to him.
5. Grease daily all miscellaneous equipment that may be assigned to his section such as:

   Car Hoist — Conveyors, Head
   Elevators — and tail pieces.
   Piggybacks
6. After performing regular assigned duties, the greaser is at the disposal of the foreman in charge.

PERIODIC MAINTENANCE

	Date: Month	3	3			
	Date: Day	13	13			
Periodic Inspection	Operating Shifts:	1/2	3/4	5/6	7/8	9/10
Motors 20 Shifts	Loaders	6771				
	S/Buggies					
	T/Trucks					
	Machines					
	Piggybacks					
Clutches 40 Shifts	Loaders					6771
Clutches 40 Shifts	S/Buggies					
Cable Reel 40 Shifts	S/Buggies					
	T/Trucks					
Contractors & Switches As Scheduled	Loaders	6771				
	S/Buggies					
	T/Trucks					
	Machines					

Periodic Shuttle Car Lubrication

	Date: Month	3		
	Date: Day	13		
S/Car Serial No.	Operating Shifts:	1/2	3/4	5/6
3220	S/Cars Day			
	S/Cars Nite			
	Symbol			
	Date Greased			
3223	S/Cars Day			
	S/Cars Nite			
	Symbol			
	Date Greased			
	S/Cars Day			
	S/Cars Nite			
	Symbol			

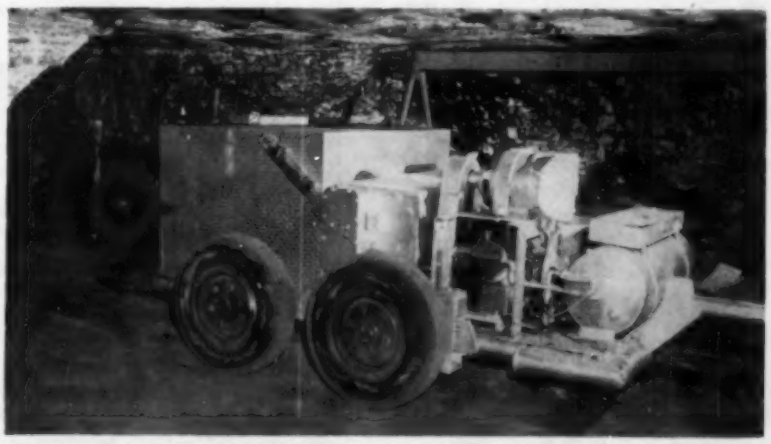
INSPECTION REPORTS and lubrication charts insure repair and adjustments before breakdowns.

the failure of pneumatic tools than anything else. They are improper lubrication and dust. Never attempt to repair tools in the mine. Send them to the shop where they can be repaired and cleaned properly.

Regardless of how much or how often pneumatic equipment is used it should be maintained. Don't neglect equipment.

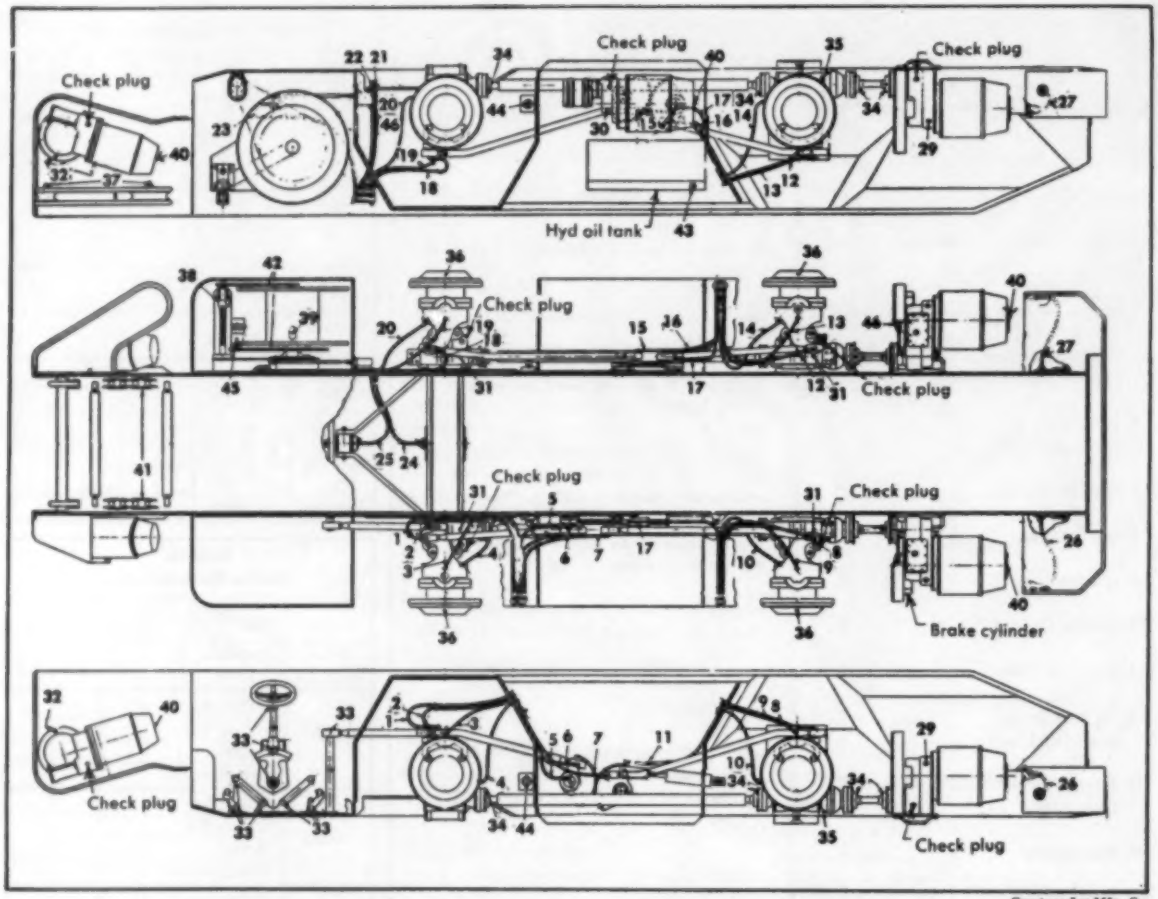
Mechanical Inspection — Face equipment requires and deserves thorough and frequent inspections. Mechanical breakdowns do not confine themselves to mechanical failures alone. They can contribute to the failure of other parts as well. The mechanical inspection should include all items not covered in the electrical, hydraulic and pneumatic inspections.

One item most commonly overlooked or ignored on mechanical inspections are loose and missing bolts. These contribute to failures that would not ordinarily occur. Be sure all bolts are tight. Replace those that are missing. Each bolt and nut has a purpose. Otherwise the manufacturer would not have installed them there.



PORTABLE LUBRICATION CAR facilities equipment servicing, does a better job.

Couplings are important to all drive units. Alignment and tightness are the main check points. Excessive heat



Courtesy Joy Mfg. Co.

MANUFACTURERS provide lubrication diagrams and lubricant specifications to help school maintenance personnel.

Lubrication Specifications

Part Greased		Lubricant	Interval
1-24	Zone lubrication lines	JLG	Every 10 shifts
25-26	Conveyor takeup	JLG	Every 3 shifts
27	Zone lubrication line	JLG	Every 10 shifts
29	Traction motor reducers	TO-M	See note*
30	Pump drive reducer	TO-M	See note*
31	Front & rear wheel drive units	GLC	See note*
32	Conveyor drive reducer	GLC	See note*
33	Oper. platform grease points	JLG	Every 10 shifts
34	Universal drive joints	JLG	Every 10 shifts
35	Differential	GLC	Every 50 shifts
36	Wheel bearings	JLG	Every 50 shifts (see note)†
37	Sheave wheel	JLG	Every shift
38	Cable-reel spooling device	JLG	Every shift
39	Cable-reel drum	BGH	Every 300 shifts
40	Motor bearings	BGH	Every 150 shifts
41	Conveyor chain	Waste oil	Every 3 shifts
42	Cable-reel chain	Waste oil	Every 3 shifts
43	Oil tank	HO-S	Check level every shift
44	Conveyor hinge pin	JLG	Every 10 shifts
45	Hyd. motor	BGH	Every 300 shifts
46	Spline		See note†

NOTE †

When changing brake lining lubricate spline joints with a calcium base grease containing 10 to 12% graphite.

NOTE *

Keep reducer filled to check plug level at all times. Caution: Do not exceed this level.

NOTE ‡

Initial fill on new cars should be approximately 6 lb of grease per wheel.

and vibration indicate faulty couplings.

Speed reducers and drive units are difficult to inspect. There are, however, certain tests that can be made. Test the bearings for slack. When possible, look at the bronze and worm gear paying particular attention to worn and damaged teeth. Note any unusual sounds. Check packing, oil seals and gaskets for leaks. Look for excessive metal cuttings in the oil. Be sure to classify reducer repairs as to their importance. Don't let needed repairs go undone.

Sprockets need only to be checked for wear of teeth and to see that they are tight on the shaft.

Chains of various types are used on mine equipment. They are similar in construction and parts. The inspection procedure also is the same. The following check list is offered as a guide for inspecting chains.

1. Check alignment of conveyor and drive chains.
2. Examine roller and connecting links for wear and breakage.
3. Look for missing cotter pins.
4. See that flights are equally spaced.
5. Check for bent and missing flights.

6. Test the chains for proper tension.

Wearing strips and guides are used to protect the frame and chain. They should be placed in the right position. A loose wearing strip or guide can really cause trouble. Keep them fastened securely. Worn strips and guides cannot do their intended job. Check wearing strips and guides closely.

Alignment of drive and takeup shafts is of primary concern. Misaligned shafts cause chain wear, breakage and bearing failure. Guard against this by making sure adjustments are made properly and that they are locked in place after adjusting.

Universal joints give very little trouble. Wear contributes to the majority of failures. Joints that are bolted to drive units cause some trouble when the bolts work loose. Check joints for wear. Keep bolts tight and lock them in place.

There are two schools of thought as to proper tire maintenance:

1. Maintain proper tire pressure by having a compressor on each section. Pressure should be checked daily. Tires found to be low should be inflated to the required pressure. Examine tires for cuts and brusies. Common practice at most mines is to leave damaged tires on the equipment until they blow out. A better rule would be to change damaged tires as soon as possible. Quite often they can be repaired, adding extra life to them.

2. Inflate tires to required pressure at the shop and seal the valve with solder. This eliminates loss of air due to bad valves. Too, the tires cannot be deflated to make riding easier. Check tires daily. Low tires should be changed and sent to the shop for repairs. Experience has proved that fewer tire changes are necessary on valve-sealed tires.

Make sure that wheels are mounted straight. See that lug nuts are tight and equally adjusted.

Axles should be inspected once a month. Pay particular attention to bearings. Make certain that the axles are straight.

Wire cable requires very little inspecting. For the most part sheaves, bushings and pins should be examined for wear. Check rope clamps to make sure that they are tight and properly installed. Whenever possible thimbles should be used at the anchor point. Frames, sideboards and guards also should be included in the mechanical inspection. One look at these parts will in most cases tell if the equipment is being properly maintained. Keep them in good condition. They not only add to the general up keep of the machine but also provide protection for personnel.

Lubrication—The importance of an effective lubrication program cannot be over emphasized. Considerable time and effort are involved in organizing and putting in effect a complete system. A thorough knowledge of the equipment, mining methods and conditions are needed before a system can be established. The following information will be needed to set up a good workable program.

1. Lubricant characteristics.
2. Selection.
3. Handling.
4. Application.

Before a lubricant can be selected to do a specific job there are certain characteristics that should be known about the lubricant in addition to an understanding of the effects that coal dust, heat, pressure, water and acid have on it.

Characteristics

1. Greases are made by compounding soaps of lime, soda, lithium or aluminum bases with mineral oil and other ingredients, depending on its intended use.

2. Steam cylinder oils are made by adding animal fat, such as lard, oil or tallow to heavy-bodied straight mineral oil.

3. Viscosity refers to the relative fluidity of an oil. It is the measure of resistance of the molecules to sliding past one another.

4. Flash point is that temperature to which the oil must be heated in order to give off enough vapor to form a flammable mixture with air.

5. Pour point is the lowest temperature at which the oil will pour or flow.

6. Additives are materials which, when added to mineral oil or petroleum grease, impart desirable characteristics, such as resistance to rusting, oxidation, foaming, and increased film strength, detergency and dispersion.

Effects

1. Coal dust increases the body of the lubricant and makes it abrasive, increasing the wear of all parts.

2. Heat thins down the lubricants, increases the rate of oxidation and decreases the life of the lubricant.

3. Pressure applied on bearings or gear teeth may cause some lubricants to thin down and squeeze out so that the lubricating film is too thin to protect the surfaces.

4. Water may cause lubricants to emulsify, resulting in loss of lubricating properties and increasing rust.

5. Acid in water can deteriorate the lubricant and cause corrosion.

Always make sure that the lubricant has the right characteristics to do its intended job. In most cases the manufacturer's recommendation should be followed.

When selecting lubricants make sure that it is based on a thorough knowledge of the working components of the machine. It may be well to check periodically to make sure that the lubricants are doing the job they should. If not, find out why and select lubricants that will hold up.

Make the lubrication system as simple as possible to avoid getting the wrong lubricant in equipment. Don't recommend a different lubricant for every job. Keep the number of lubricants at a minimum.

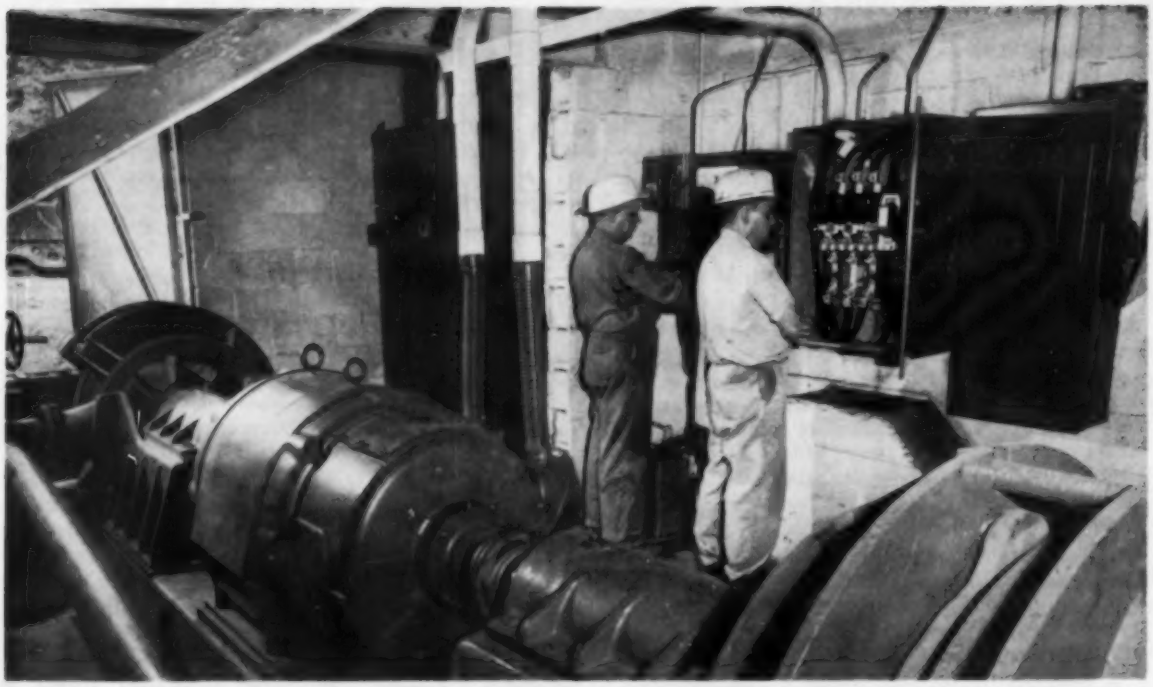
Every effort should be made to keep lubricants from becoming contaminated with water, dust, dirt and other foreign matter.

The central storage place should be equipped to handle large drums with ease and to keep spillage to a minimum. See that proper dispensing equipment is available to transfer the oil to mine containers. Don't mix oils and grease in containers.

Proper storage and handling of lubricants in and around the mine can be summed in one word: cleanliness.

Proper application of lubricants plays an important part in the overall lubrication program. It actually boils down to (1) applying the correct lubricants at the right places, (2) applying a sufficient amount but not over greasing or oiling and (3) applying the lubricants at regular intervals.

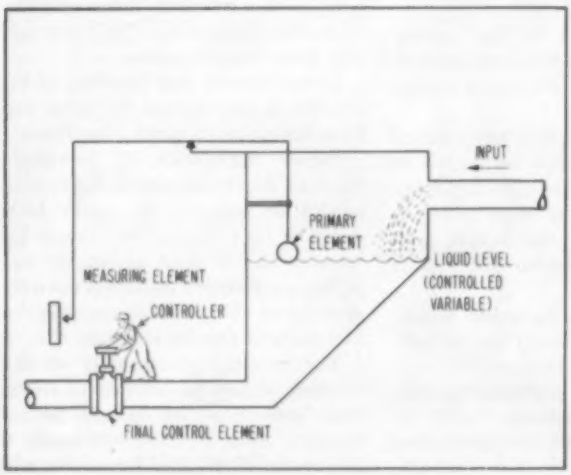
The working components of the machine should be studied to determine how often they should be lubricated. After careful study, make a lubrication chart of each machine and follow through to see that it is carried out. Oil companies have lubrication engineers and will be more than glad to prepare charts for all equipment at the mine.

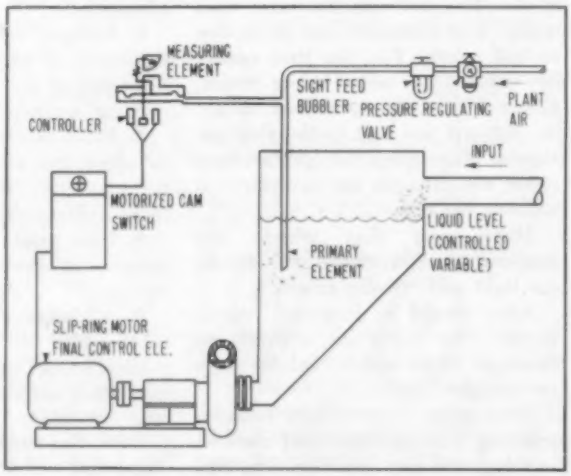


TWO REFUSE PUMPS, driven by a wound-rotor motor, form a system that can be operated at variable speed. Heart of the system is the motorized cam switch in the upright cabinet in the corner of the pumproom.

Automatic Refuse Pumping

Variable-speed control on Red Parrot pumping unit improves refuse-disposal system in which fluctuating loads are the rule. Adjustment of motor speed compensates for changes.





IN MANUAL OPERATION (left), a primary element measures the level, the operator sees the change and then makes an adjustment of the regulator, in this instance, a valve. The automatic system performs the same function without the services of an operator. In the Red Parrot scheme, plant air is supplied to a pressure-regulating valve through a sight-feed bubbler (serving only as an indicator of supply air) to a line supplying both the measuring element and a tube in the slurry tank. As the slurry level changes, the pressure exerted on the measuring element changes. This causes the controller to adjust the cam switch and, in turn, the speed of the motor. Speed changes of approximately 10 rpm are used on the motorized cam switch.

DUAL PROBLEMS of controlling stream pollution and reclaiming water have been overcome at the washery of Red Parrot Coal Co., Prenter, W. Va., with an automatic variable-speed-control pumping installation.

This installation, which handles the pumping of variable loads to settling areas some 350 ft above and 1,300 ft away, is believed to be the first of its kind in West Virginia. Red Parrot is an operating division of North American Coal Corp.

West Virginia's water-pollution control law stipulates that refuse from coal washery plants shall not be allowed to enter public streams. The state water commission does not consider coal washing wastes, in themselves, a public health problem However, some of the reasons for keeping it out of streams are cited in the commission's "Coal Washery Waste Treatment Guide" as follows:

1. Black suspended solids may be carried for many miles and left on river banks during flood periods.
2. Silt deposits on stream bottoms decrease production of bottom animals and interfere with fish spawning.
3. Bathers and fishermen do not appreciate muddy or turbid waters.
4. Deposits have washed into some city water supply intakes and overloaded settling basins.

Since trucking the refuse away from this particular washery is out of the question, Red Parrot Coal Co.'s solution is to pump the refuse to settling areas. Past experience has shown, however, that some variable-speed arrangement was desirable in order to handle varying loads from the washery.

An area 350 ft above the washery was dammed to form a settling pond, and provide gravity flow for reclamation of the water. Previously it had been necessary to store water in ponds and abandoned mines for use in the washery during dry periods.

The problem was presented to Morris Machine Works to install a pumping system flexible enough to handle a variable washery output over a fairly wide range of total dynamic heads. It was established the capacity could vary between 500 and 800 gpm at total heads from 380 ft to 424 ft.

In addition, consideration had to be given to the fact that abrasive solids were to be pumped. Therefore, a system had to be used that was conducive to long life of wearing parts and heedful of critical carrying velocities. Checks showed the slurry to contain 15-20% solids of ¼ x 0 size.

PUMPS DISCHARGE into a sluiceway which leads to elevated settling pond.

It was determined that two Morris 4-in Type RXL pumps, staged in series with a double-extended-shaft wound rotor motor between them, should be used. The motor is a 200-hp, 1,200-rpm Westinghouse, equipped with Westinghouse secondary controllers. The unit can be operated automatically with the secondary controllers or by a manual wheel.

Along with the variable speed control, consideration had to be given to the method of level measurement, and ultimate control of the wound rotor motor. The illustrated box on these pages shows how the secondary controllers watch level measurement and adjust automatically to varying loads.

Slurry from the washery is brought to an 8-ft-deep sump, and with the variable speed control, level can be maintained in the sump within plus or minus a few inches.

The refuse is pumped some 1,300 ft to the settling area, and even though part of the pipeline goes straight up the mountain, the system is handling the refuse efficiently, even with varying loads.

As mentioned previously, water reclamation is important to Red Parrot too. After a period of retention in the pond area, the solids settle out and clarified water is made available for further plant use. The present installation was sized to accommodate future expansion, and therefore is expected to handle even larger amounts of refuse in days to come.

TOP COVER REMOVAL is a shovel-and-truck operation which leaves an operating bench for the large draglines 140 ft above the coal. The shovel swings a 5-cu yd dipper to load the 22-ton trucks.

HARD BANDS OF SHALE are removed from the coal seam by this tractor equipped with a hydraulic ripper and front-end loading bucket.

Deep Stripping

Acorn Bank, at Bedlington near Newcastle, England, is a large-scale stripping operation in which 230 ft of overburden is removed by shovel. truck and dragline. Coal is derrick-hoisted out of the deep pit.

LARGE-SCALE strip mining operations undertaken at Acorn Bank by Costain Mining, Ltd., have aroused the interest of mining engineers in many parts of the world. Visitors to the site have come from over 20 different countries, including Russia. Even in the United States, where operations on a vast scale are not uncommon, information about the Acorn Bank project has been frequently sought by technicians in the fields of construction, engineering and excavation. In cooperation with Costain enterprises, *Coal Age* presents this description of the project.

TWO 25-YD DRAGLINES, working from the bench prepared by the shovels, remove the lower 140 ft of overburden. The initial box cut at Acorn Bank required the removal of 10 million cu yd. The job calls for development of 65 100-ft-wide cuts.

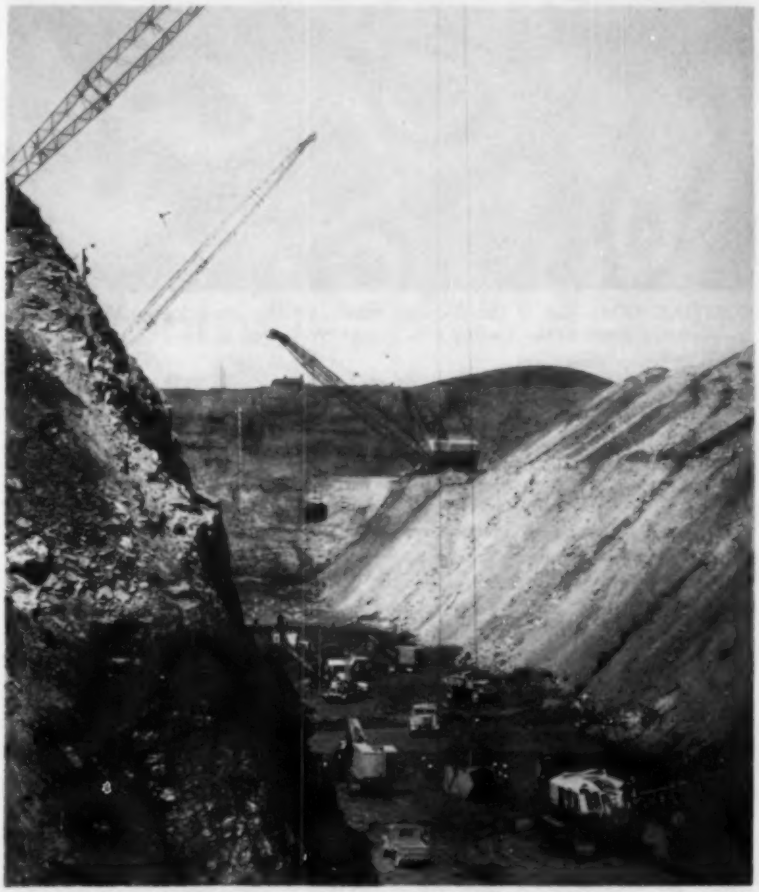
Overseas

The Acorn Bank opencast coal contract was let to Costain Mining by the National Coal Board in 1955, and is programmed to produce more than 5 million tons of coal in 7 yr.

Interest in the project quickened with the opening of the initial box cut—the largest man-made hole in Europe—in June 1956, the formation of which necessitated the removal of nearly 10 million cu yd of overburden. Other developments which followed were the building of a 2-mi private road from site to screening plant, and the commissioning of a fleet of four coal haulers with eight 40-ton bottom-dump trailers.

In June, 1957, the site moved into its period of peak production and this will be maintained until the bulk of the coal has been removed. In the spring of 1957 four high speed derrick cranes were installed to hoist the skips containing 10 tons of coal each and tip them into the haulers, and the site now has one of the heaviest —if not the heaviest—concentrations of earth-moving equipment in Europe.

The highest week's output at Acorn Bank (a world record from a deep site) was achieved in June, 1957, with the production of 20,800 tons.



COAL-LOADING DERRICKS operate from the bench 140 ft above the coal. Smaller shovels in the pit load 10-ton skips or 5-ton clamshells.

HOISTING COAL out of the deep pit eliminates the need for building haulage ramps down to the loading site. Trucks are loaded at the 140-ft level.

The highest day's output yet achieved is over 4,000 tons.

Concentration of Plant

Equipment engaged on the removal of overburden includes two 1150-B 25-yd draglines manufactured by Bucyrus-Erie; three 5-yd electric shovels by Ruston-Bucyrus and a fleet of 22-ton Euclid rear dump trucks, and a number of 2-yd and 1-yd shovels manufactured by Ruston-Bucyrus, Newton Chambers and Lima are employed in coal excavation in the pit.

The four 13-ton electric derricks used for hoisting the coal were designed and manufactured by Butters Bros., and can operate with either 10-ton capacity skips or 5-ton grabs.

Auxiliary plant includes both Caterpillar D-8 and Vickers VR-180 dozers and scrapers, and a Caterpillar 955 Traxcavator fitted with hydraulic back ripper is being successfully used to remove the hard bands of shale occurring among the coal.

A recent innovation is horizontal drilling by 24-in augers at the southern limit of the site and to date some 500 tons of coal have been recovered by this method.

Method of Working

The general method of working the site, planned at the beginning of the job, has been followed. Along the eastern boundary an initial box cut 3,200 ft long, 100 ft wide and 230 ft deep was formed in mid-1956. Parallel cuts 80 ft wide and running in a north-south direction are to be made progressively towards the west and the number of similar cuts necessary before the site is worked out will be about 65. In June 1957 the eighth cut was being worked.

After removal of 12 in of topsoil and 3 ft of subsoil, which are stored on the site, 5 cu yd electric shovels are used for reduction of overburden down to about 140 ft above the bottom coal.

Highway on the Highwall

Working on the highwall highway thus formed are the two 1150-B draglines, four electric derricks and rotary air-blast drills, in addition to the coal hauling equipment. The draglines, working one at either end of the cut, remove the overburden down to the coal seams and deposit the spoil in the previous cut, from which the coal has been removed. In the early stages of this work some 6 million cu yd was removed by Euclid dump trucks to an old site at Ewart Hill 1 mi distant, in addition to nearly 4 million cu yd which is lying in dumps around the site to await replacement in the final void.

Work at Acorn Bank goes on throughout the whole week, night and day. The draglines work three 8-hr shifts each day and the rest of the site work is in two 12-hr shifts, each shift being in charge of a works superintendent. Coal loading is carried out during hours of daylight.

The site maintenance shops enable most jobs to be tackled without delay, including complete engine overhauls; and a staff of fitters, welders, and riggers is on call throughout the 24 hr for emergency as well as routine work.

Coal Loading Derricks

Four electric derrick cranes are used for hoisting the 10-ton loaded skips from the cut and tipping into the coal haulers or for loading by 5-ton clamshell grabs. Each crane is mounted on three bogies at 60-ft centers which are fitted with four large diameter single-flanged rail wheels set for 66-in rail gage. The two end bogies carry 60-ton ballast.

To enable the direction of travel to be altered through 90 deg, four 25-ton hydraulic jacks are fitted to

each bogie, allowing the bogies to be raised and the wheel housings to be rotated to the required position.

Visibility for the operator is a feature of the machine, as the cabin is located on the top section of the mast, with all controls placed well forward in the control cabin so as to allow the operator a clear and uninterrupted view of the skip in all working positions. His eye level is 36 ft above the ground.

Skips are all of welded sheet-steel construction with open end. The hoist trunions are set slightly forward of center of gravity so that the loaded skip is balanced by the tip rope. The skip is emptied by lowering on the hoist rope while the tip rope is held by the brake.

Features of the derricks are as follows:

Maximum Load

13-tons (10 tons coal and 3-ton skip). The crane was tested on a 25% overload.

Maximum Radius

140-ft for raising full loads. Jib length, 152-ft tubular lattice, all welded.

Speeds of Operation (Full load)

Hoisting, 120 fpm
Slewing, 450 fpm
Luffing, 60 fpm

Current Supply

440-v, 3-phase, 50-cycles

Motors

Hoist, 180 bhp
Slew, 35 bhp
Luff, 75 bhp

A small plate-laying gang is employed on the tracks, and when moved to another position the derrick is towed by a dozer.

Coal Augering

Horizontal augering for coal is something quite new on an opencast site in Britain. At Acorn Bank in recent months a Joy coal auger has been in use for experimental drilling into the seams at the northern and southern limits of the site to recover extra coal beyond the area being worked by the method adopted for the site generally. The total amount of coal recovered so far is around 500 tons.

The auger is electrically powered, with a supply of 500-v, 3-phase, 50

SPARE UNITS are included in the coal-haulage fleet. The tractor hauls one 40-ton bottom-dump trailer while another is being loaded.

Acorn Bank Highlights

Power available:	Electric	6,000
	Diesel	17,000
	Total	23,000 hp
Average horsepower per man		100 hp
Production per week:		
Overburden removed		540,000 tons
Coal dug (average)		16,000 tons
Production per man shift:		6.2 tons

Coal Transport

A new "cut" is formed every six weeks. The bulk of the coal is hauled by four 40-ton units to the screens 2 mi away. Each hauler makes 60 trips a week (250 mi). In addition, a fleet of 15-ton Euclids and 7-ton Bedfords is used and the coal fleet covers a total of 4,000 mi per week.

Overburden Hauling

Fleet of Euclids moves 180,000 tons of overburden each week and the average round trip is one mile. Each Euclid carries 20 tons of rock, and the fleet travels 9,000 mi per week.

Drilling

About 14,000 ft, or 2 ¼ mi, of drilling is done each week by Joy-Sullivan units. Since the start of the contract 170 mi have been drilled. Before the contract is finished over 800 mi of 6-in hole will have been drilled for blasting.

Area of the site is 440 acres.

Total dig during contract will be 120 million cu yd.

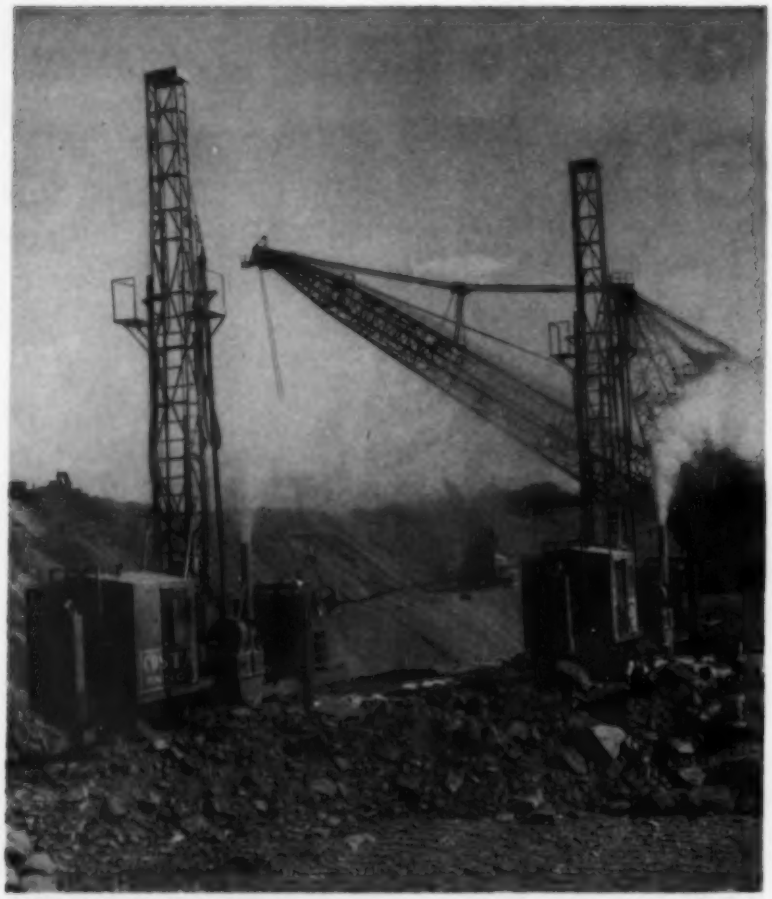
Total dig to date is 21 million cu yd.

Coal produced during contract will exceed 5 million tons.

Coal produced to date is 720,000 tons.

Highest day's output is 4,016 tons on June 20, 1957.

The cut is the largest man-made hole in Europe. To form it, 9.9 million cu yd of material were removed. Before the contract is completed between 60 and 70 cuts will be made.



ROTARY AIR-BLAST DRILLS produce approximately 14,000 ft of 6-in blasthole each week. Completion of the contract will require 800 mi of blasthole.

cycles. It is mounted on a steel frame with small-diameter single flanged steel wheels set for a 42-in rail gage. Four hydraulic jacks are fitted one to each corner for leveling up the machine.

A barrel-type cutting head fitted with 18 tungsten-carbide tipped bits and having a pilot drill with eight finger bits set in the center of the barrel head is used. The outside diameter of the cutting head is 30 in, and the length of auger flights 48 in.

The bits are fed into the hole by a hydraulically operated rotating ram which travels a distance of from 4 ft to 6 ft. To facilitate hoisting, fitting and removal of flights, a small derrick arm has been incorporated.

Horizontal holes are drilled to a depth of 60 ft at approximately 3-ft centers and two drilling heads are available, enabling flights to be stored in the completed hole and extracted for use by means of a winch fitted to the machine.

The penetration rate averages 1 fpm and each completed hole yields approximately 12 tons. The coal falls onto a small mobile conveyor and is loaded into road wagons. The next stage is to increase the depth of each hole and thus step up the output per hole.

Coal Road

Costain in 1956 built a 1½-mi-long private road with a 30-ft carriageway direct from Acorn Bank to the screens at Bebside. Among the considerations which lead to this project being planned were that loads over the public highway, which are limited to 14 tons, were too small to allow long-term economic loading and hauling, and the danger to the public because of the presence of sharp bends and steep gradients. There are three fly-over bridges crossing two main roads and the river Blyth. 50,000 cu yd was excavated in cutting through a hillside and 100,000 cu yd of sandstone and poststone used for making the road.

The road base consists of a 5-ft thickness of standstone taken from the site, which was allowed to consolidate under traffic, but which has now been surfaced with 3 in of 2¼-in whinstone, rolled and blinded with ¾ in of quarry rejects, topped with a wearing surface of 3 in of tarmac, bringing it to a standard comparable with a modern public highway.

Work Study

Costain Mining Ltd., have introduced to Acorn Bank a work study unit and the technique has already shown that close attention to operating methods can yield considerable savings in time, effort and cost. Work study has been applied to getting the facts necessary for keeping the major items of equipment operating at peak efficiency and maximum economy. Some improvements in method have been achieved and more ambitious production plans thus made feasible. It is hoped to gain from work study comprehensive data, both for the control of the Acorn Bank contract, and for planning future contracts to the most economic standard.

Standard Buildings

Architects in Europe have been concentrating during the last 50 yr upon research into the design of standard components to serve a wide variety of uses in industrial buildings. The aim of this research is to discover constructional units which will be cheap, efficient and quick to build and pleasant in appearance.

The Costain Standard Accommodation Unit was designed with these aims in view. A constructional method has been developed based on a 6-ft module which satisfies all these aims and which lends itself for assembly into buildings to house all types of administrative offices, test laboratories and works canteen, in fact, the normal requirements of industrial administrative buildings.

The first Standard Accommodation Unit was built at Acorn Bank in 1955 to house the National Coal Board Area Staff and Costain Mining, Ltd. In 1956 a large unit was erected at Westfield, Fifeshire, for the Opencast Executive, which is now occupied

EACH COAL HAULER makes 60 round trips a week from loading derricks to primary screens 2 mi away. Four units like this 40-ton bottom-dump tractor-trailor combination are in use at Costain's Acorn Bank project.

and functioning as an Area Office of the National Coal Board.

This year an extension to the Acorn Bank office has been completed for the Opencast Executive and two other area offices at Solway and Gatewen, near Wrexham, will be starting immediately. All these buildings are of the Costain Standard Accommodation Unit design as produced by Messrs. Reavell & Cahill, F.F.R.I.B.A., of Alnwick, Northumberland, who are consulting architects to Costain Mining.

Skilled Team

Costain has at Acorn Bank its resident managing director, under whom are the agent (in executive charge of all site work), the chief engineer (responsible for civil engineering works, surveys and planning), the plant manager (in charge of the plant depot and field maintenance crews) and the company accountant (with responsibility for costing, wages, accounts and store-keeping).

In the field is a highly skilled team of 400 operators of all grades, many of whom have been engaged continuously on the company's opencast coal contracts for several years. Some of the present staff, indeed, held positions on the first opencast undertaken by the Costain group 14 yr ago at Waun-y-Gilfach in South Wales, where the largest machine employed was a 1¾-yd shovel.

Since operations were started in the northeast in March 1947, the best men have been retained and moved from contract to contract with the company, being added to as the contracts grew in size and number; until now at Acorn Bank there is a team well suited to the scale of the operations. No matter how much horsepower is put at the elbow of the worker, it is the quality of the man and the use he makes of the power at his command that is important.

A charge often laid at the door of management is that poor communications at all levels are a principal cause of inefficiency and less than maximum production. The value of keeping everyone as much in the picture as possible is fully realized at Acorn Bank and every effort made to explain to each man how he fits into the general plan.

Daily and even hourly production figures are known throughout the site and evoke wide interest, particularly when there is a likelihood of bettering a previously established record in earthmoving.

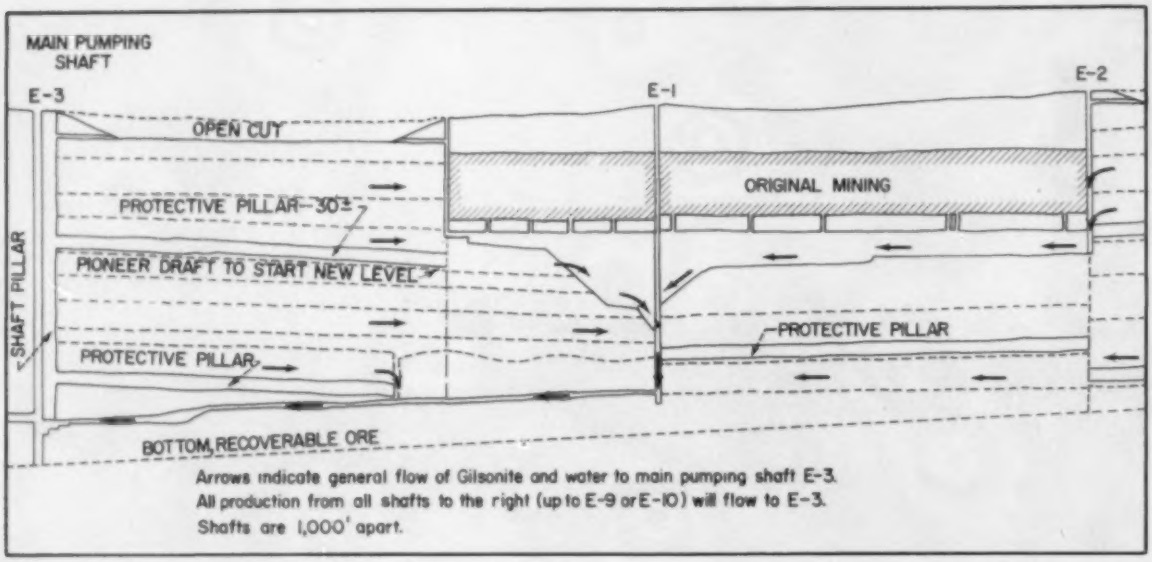
Tailor-Made Fields

Techniques in restoration have improved almost beyond knowledge since the early days of opencast mining. It is no longer simply a matter of removing first the topsoil, then the overburden, digging the coal and then returning the overburden and replacing the topsoil. Land which is taken over for coal recovery can now be returned to the farmer tailor-made to suit his requirements. Drainage can be improved, uneveness removed, slopping land leveled down or the contours altered as desired.

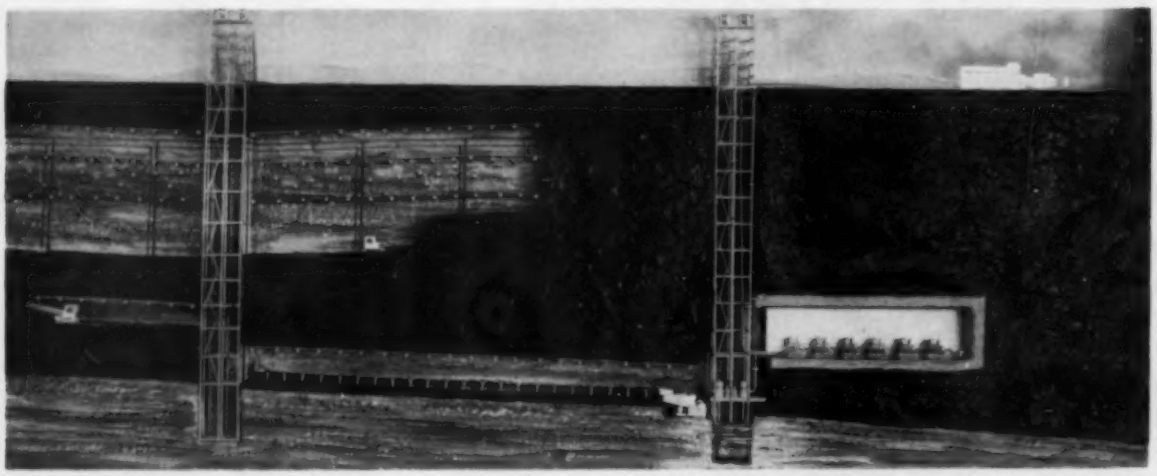
So vast is the scale of operations at Acorn Bank that one of the contract conditions is that the land shall be progressively returned to agriculture as the contract proceeds.

The first twelve inches, which is generally regarded as the topsoil depth, is removed by scraper and placed in a dump outside the working area. Once the topsoil has been removed the next 3 ft depth of subsoil is removed in similar manner and also dumped outside the working area, and the earthmoving can proceed without fear of damage to good soil.

After mining operations are completed the ground is regraded, bulking of the overburden generally making up for the loss of mineral removed. Subsoil is returned to a depth of 18 in, rooted and stonepicked, the remaining 18 in, spread and again rooted and stonepicked, ready for the topsoil to be spread.


MAIN PUMPING SHAFT
E-3
E-1
E-2
OPEN CUT
ORIGINAL MINING
PROTECTIVE PILLAR—30±
PIONEER DRAFT TO START NEW LEVEL
SHAFT PILLAR
PROTECTIVE PILLAR
PROTECTIVE PILLAR
BOTTOM RECOVERABLE ORE
Arrows indicate general flow of Gilsonite and water to main pumping shaft E-3.
All production from all shafts to the right (up to E-9 or E-10) will flow to E-3.
Shafts are 1,000' apart.

SHAFTS AT 1,000-FT INTERVALS provide the openings for hydraulic mining, transportation and hoisting of Gilsonite at Bonanza, Utah. Water and ore flow down shafts and through drifts at the bottom of the vein to pumping shaft E3 at far left.

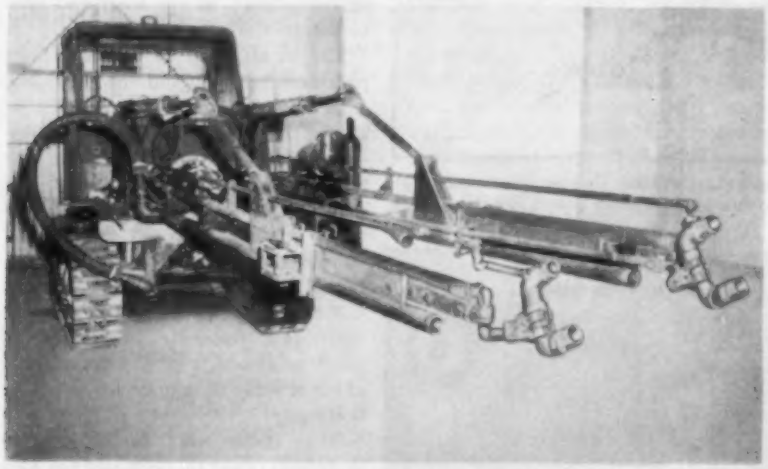


PRODUCTION PLAN is based on cutting drifts 12 ft high from one shaft to the next on a grade of 2½ deg to permit fluming ore back to shafts and down to the drift to the crushing plant preceding the pumps which hoist the ore to the surface.

Vertical-Seam Mining by Jet Cutting, Fluming and Pumping

Water cuts the material and delivers it to a pumping station for hoisting to the surface at the Bonanza mine of the American Gilsonite Co. Jet-car output, with two operators, is expected to be 330 tons per shift. Final step is pumping the material 72 mi overland to the processing plant.

JET CAR specially developed for the job mines Gilsonite hydraulically. The ore is cut by water at a pressure of 2,000 psi provided by 10-stage pump.



TWIN HYDRAULICALLY CONTROLLED BOOMS on jet car each carry two nozzles on swivels for cutting right or left. Air motor provides power for motions.

SOMETHING NEW has been added to the art of pitch mining by the American Gilsonite Co. at its Bonanza, Utah, operations. That something includes jet cutting and hydraulic transport to the hoist, which in turn is also hydraulic and is supplemented by overland transport via a 72-mi pipeline to the processing plant at Gilsonite, near Grand Junction, Colo. This plant converts the Gilsonite into gasoline and calcined high-purity metallurgical coke for aluminum producers and other specialty carbon users.

How Gilsonite Occurs

Gilsonite is the registered trademark for a material whose scientific name is "Uintaite." It is a solid hydrocarbon, or asphaltite—in effect a solid oil. It is commonly supposed to have been formed in much the same way as oil was formed, with the original material, as a result, perhaps, of polymerization, heat and the action of mineral catalysts, being changed into the solid material of today. With a specific gravity of 1.04, Gilsonite weighs 65 lb per cu ft, compared to approximately 80 lb for most bituminous coals and 92 lb for the common anthracites.

The principal Gilsonite veins are located in the Uintah Basin of eastern Utah and western Colorado. Credit for its discovery is generally attributed to T. H. Wigglesworth, a surveyor for the Denver & Rio Grande Western Ry., who first reported Gilsonite in 1883. Samuel H. Gilson became interested in the material in 1884, and as a result of his efforts to find a market his name was applied to it by local people and eventually became the present registered trademark.

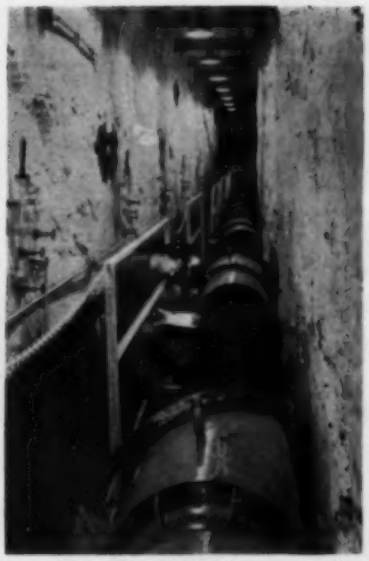
The center of American Gilsonite mining operations is at Bonanza. All of the Gilsonite deposits in the basin are in an elliptical area about 10 mi wide and 60 mi long. Estimated reserves are 16 million tons—enough for more than 50 yr at the present rate of production.

Gilsonite occurs in vertical or near-vertical veins in fissures in the generally flat sandstones and shales in the area as a result of being squeezed up from the shale horizons in which it was formed. The fissures strike northwest-southeast through the basin, and the veins vary from a few inches to 22 ft in width. Some go as deep as 2,000 ft. The outcrop of one vein may be traced more than 9 mi.

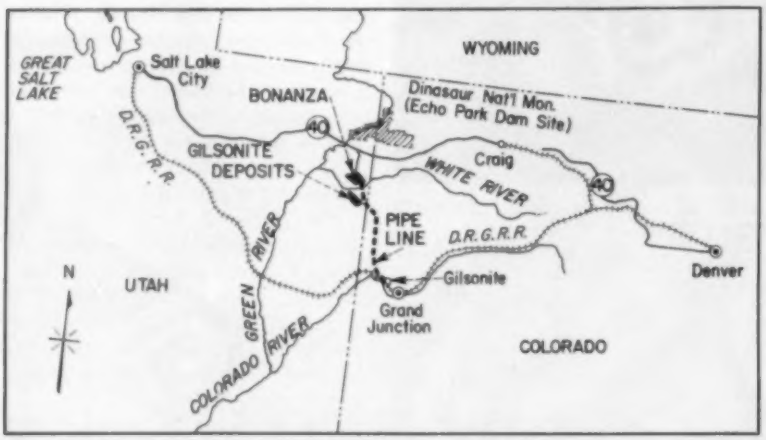
The Mining Approach

In addition to the normal problems encountered in recovering a vertical vein, Gilsonite poses some special ones. The earliest mining system was to cut the ore out with hand picks and let it roll down a 45-deg incline to the shaft for hoisting by bucket. The accompanying profile shows the 45-deg inclines on each side of one of the

FLUME of half-round steel delivers Gilsonite to foot of shaft for crushing and pumping to the surface.



HOISTING PUMPS 800 ft down in the Eureka vein provide the push to lift crushed Gilsonite to the surface.



PIPELINE 72 mi long delivers Gilsonite from mine in Utah to new processing plant near Grand Junction, Colo. The line traverses one mountain pass 8,500 ft high.

SUSPENSION BRIDGE 700 ft long over the White River is one of two required along the 6-in-diameter pipeline carrying 8-mesh ore to processing plant.

older shafts at the time the American Gilsonite Co. took over. The major difference from the earliest system was the introduction of certain mechanical equipment to replace or supplement hand picking.

Although Gilsonite will not burn in the solid state, the dust is highly explosive. A number of disasters consequently accompanied earlier attempts at extraction. This was the major problem confronting the new owners, which was solved by going completely to "wet" methods of mining and transportation.

The general method of attack (see profile) is to sink shafts at distances of approximately 1,000 ft and cut out the Gilsonite between shafts starting at the top and working down. Shaft E3 is the opening through which the ore is pumped to the surface, and the workings are arranged so that all the material removed in mining can be flumed in water to this point. Vein width must be at least 6 ft to accommodate the face equipment employed.

The accompanying photograph of a model of the workings shown in the profile illustrates the sequence of mining, as well as the method of fluming the ore to the pumps and preparation equipment at the bottom of the "hoisting" shaft. To start a new level, separated from the one above by a pillar approximately 30 ft thick, the jet cutter starts at one shaft and cuts across to the next.

Height of a cut or bench is approximately 12 ft, and the drifts are angled up approximately 2½ deg to permit the water to carry the ore back to the shaft and the main flume system. When one cut is completed, the machine moves back to the shaft and starts another. As each drift is advanced the walls on each side are bolted on centers of 6 ft, using C.F.&I. bolts with Pattin expansion shells, plus triangular plates and 2x12 plank headers 3 ft long. A special machine is being developed for this side-bolting.

After about every fourth cut, or each 50 ft of depth, cross timbers with a plank or industrial fencing floor, or both, are installed as protection against the possibility of material sloughing off the walls. As previously noted, a 30-ft pillar is left about every 350 ft of depth as further protection. Since the openings are vertical fissures in strata lying nearly horizontal, caving is not encountered.

Jet Mining

The present Gilsonite mining method and the equipment employed, was worked out by company personnel engaged in this operation for a number of years. In view of the explosive nature of the dust, the overriding goal was establishment of conditions which would render ignition as nearly unlikely as humanly possible. Float dust is practically eliminated by mining with water, and this, plus air operation of the face units, removes the usual sources of ignition.

After taking care of the dust problem, the next objective was high tons per man through high-capacity mining equipment. The face unit resulting from study of the problem provides both safety and high tons per man. Hydraulic transport of the ore after it is broken out of the solid, and pumping to the surface, are additional safeguards against dust ignition. They also contribute to high overall efficiency, since they are practically laborless.

The face mining unit, termed the "jet car," is built on the chassis of a Terratron tractor. An Eimco air motor supplies the power for tramming and operation of the two booms on which the cutting jets are mounted. As indicated in the accompanying photographs, each boom is equipped with two cutting jets mounted on a swivel to permit them to operate either to the right or the left. Air for the operation of the car, and water for cutting the Gilsonite, are brought to the car through hoses.

Round nozzles with a diameter of ¼ in are presently used for cutting. Experiments are being conducted with other types, however, to convert the cutting jet to a straight stream instead of a narrow-angle cone, which is expected to improve the efficiency of the cutting action.

Pressure of the water supplied to the jet is approximately 2,000 psi. The volume is around 300 gpm. It is supplied by a Bingham 10-stage centrifugal pump on the surface driven by an 800-hp Enterprise diesel engine. Clear, fresh water is used for cutting. The engine and pump unit also acts as a standby for the pipeline to the processing plant.

Two men in a glass-enclosed cab with power wipers operate a jet car. General practice is to shear along the walls on each side of the vein to a depth of about 6 ft. Then, working from the top, the lift is cut down by manipulating the jets as necessary, each man working independently but coordinating generally with the other. Normally the nozzles are kept as close to the material as possible, and the cutting is made possible by the presence of cracks and fissures much as in coal. Care is required to make sure that chunks too large for fluming and subsequent handling are not produced in the cutting operation.

With improved jet nozzles, output per car is expected to average 330 tons per shift. So far, one car has driven 95 ft in a shift in a vein about 10 ft wide, making the standard 12-ft-high cut.

Hydraulic Haulage

All Gilsonite is flumed and pumped in water from the face at Bonanza, Utah, to the processing plant at Gilsonite, Colo., 72 mi away. The fluming operation starts with a ditch cut at one side of the drift by one of the two jet booms. The ditch is a foot or so wide and about the same deep. The pitch of the drift, as previously noted, is about 2½ deg down to the shaft, which is sufficient to permit the Gilsonite broken out of the face to be carried away by the jet cutting water plus some extra low-pressure water for fluming.

At the nearest shaft, the water and Gilsonite drop down a metal column to a flume made of half round steel segments, which carries it to the next shaft, where the process is repeated until the material arrives at the "hoisting" shaft. Here, since size is not a consideration with Gilsonite, it is crushed to ¾ in and pumped to the surface by centrifugal pumps.

Overland Pipelining

Absence of other forms of transportation, plus the fact that water already was involved in the mining operation, plus the further fact that pipelining is a highly economical transportation system resulted in the decision to pump the Gilsonite from the mine to the processing plant. The 72-mi line is the first to transport solid materials over mountainous country. It traverses two suspension bridges and negotiates an 8,500-ft high mountain pass, and has worked without a moment's hitch since it first went into operation in April, 1957.

Diameter of the line is 6 in. It carries a slurry made up of about 40% Gilsonite and 60% water and delivers 700 tons of 8-mesh material to the processing plant a day at a discharge rate of 350 gpm. Two pumps put the slurry to the top of Baxter Pass, from which the flow is downhill to the plant. A third spare pump is installed and the jet-cutting pump previously noted serves as a standby unit. Horsepower of each of the pipeline pumps is 300, and they maintain a pressure of 2,200 psi at the feed end.

The line was designed by the engineering department of the Standard Oil Co. of California. A pilot model of the line was built and operated at the Colorado School of Mines Research Foundation, and pumping tests were made by the Wilson-Snyder Mfg. Co., at Braddock, Pa.

The line is designed for continuous flow, and will be shut down only when all slurry has been flushed out of it. Standby diesel equipment is insurance against loss of pumping power, and as a final measure of protection a reservoir is provided at the top of Baxter Pass which can flush the system in both directions. Backflushing also can be done by a pump at processing plant.

The line velocity resulting from the pumping of at least 350 gpm gives assurance that the solids will not settle out in operation. In addition, the line is laid in a reasonably flat grade, except for 2 mi past the summit of Baxter Pass, where 21-deg slopes were necessary. Uniform slurry content is maintained by constant agitation in two 200,000-gal tanks at Bonanza. If a higher rate of delivery is desired, the Gilsonite fraction of the slurry can be increased to 50%, compared to the present 40%.

Responsibility for the Bonanza mining and pipelining operations lies in the hands of Paul Borden, superintendent. Other members of the Bonanza organization include L. F. Williams, general mine foreman; R. F. Dewey, mining engineer and a former member of the Paul Weir Co. staff; Jack Diskin, assistant mining engineer; and Pete Corey, formerly with the Independent Coal & Coke Co., safety engineer for both the mine and processing plant.

American Gilsonite Co. headquarters are in Salt Lake City. Ernest F. Goodner is president; G. A. Davidson, W. L. Kallman and R. E. Nelson are vice presidents; and E. H. Owen is secretary and treasurer.

BEFORE effective pollution control, stream pictured above, is contaminated with plant effluent.

AFTER Y & O constructed settling ponds and a filtering process, stream is now free from the effluent.

How Y & O Controls Stream Pollution

Minimum cost and simplicity of design are features of a system to control stream pollution at the Youghiogheny & Ohio Coal Co.

IF YOU HAVE A PROBLEM of disposing the fine solids in the effluent from your preparation plant, you might try what the officials of the Youghiogheny and Ohio Coal Co. did at Van, W. Va., under similar circumstances. They built an impounding reservoir on top of their slate banks to receive the run-off from the plant. Solids settle out in these basins. The filtrate leaving the banks and entering the natural drainage system meets the requirements set up by the West Virginia Water Control Commission.

Disposal System

The preparation plant, which consists of a Chance cone, Deister Diagonal-Deck tables, Peterson filters and thermal dryers, discharges 500 to 550 gpm of waste water. This water flows to a disposal sump through an 18-in cement-tile drain line.

The sump and pump house are located near the plant and at a lower elevation to permit natural drainage from the plant. Sump dimensions are 16x16x6 ft.

Open double-Y tiles, near the top and extending across the sump, are used to direct the flow of the effluent over the screened surface of the sump. The screens keep oversized solids, which might clog the suction ports or damage the pump, from entering the sump. Splash plates are installed at each discharge point to reduce wear on the screens

To keep solids from settling and accumulating in the sump, the company constructed a multiple-suction unit consisting of three branches joined together near the pump with each branch having three suction ports equally spaced. The unit provides for a suction line on each side and in the middle of the sump.

In case the suction ports become clogged, fresh water lines have been installed to flush them out.

The pump is located below the floor of the sump and requires no priming. This makes it possible to stop and start the pump automatically.

Material used in constructing the pipe line from the sump to the settling ponds consists of 2,200 ft of 6-in metal pipe and Dresser couplings. This line was installed above ground on an average grade of 5%. The difference in elevation between the sump and the slate bank is 100 ft. The discharge end of the pipe is above the slate bank and ends at the first settling pond. From this point, a trench with leadoff branches to each pond was made so that the effluent could be directed to any pond.

Another way to direct the flow is to add or take off pipe to the pond to be used. The pipe line is turned a quarter of a turn every 3 to 4 mo to increase the life of the pipe.

The disposal area consists of four settling ponds covering an area of 165,000 sq ft. It is located between the mountainside and the slate bank. Solids from the effluent settle in these ponds and the water filters through the slate bank and enters the natural drainage system. When a pond becomes filled with solids the effluent is directed to another pond.

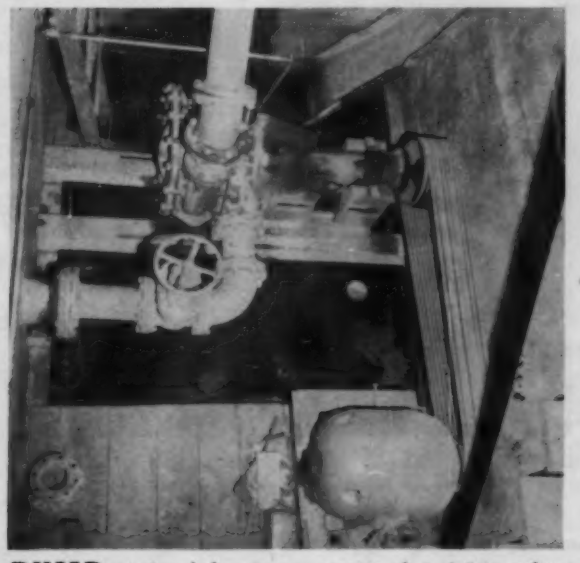
The slate bank, which serves as part of the pond wall, is constantly being increased in height with slate from the plant, thus providing a long life for the settling ponds.

Equipment

Before selecting the three major equipment items of this system, it was

FACILITIES permit natural drainage of waste water to the sump through 18-in tile line.

SUMP features double-Y tiles and splash plates to distribute effluent and screen oversized solids.



PUMP station below sump consist of a 4x6-in volute pump, 60-hp motor and automatic starter.

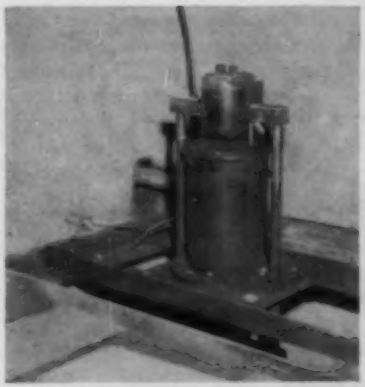
AUTOMATIC starting and stopping are controlled by a float make-and-break contactor.

necessary to determine present and future job requirements. Items requiring careful consideration were pump, motor and starter. After weighing all important factors, the final equipment selections and data are as follows:

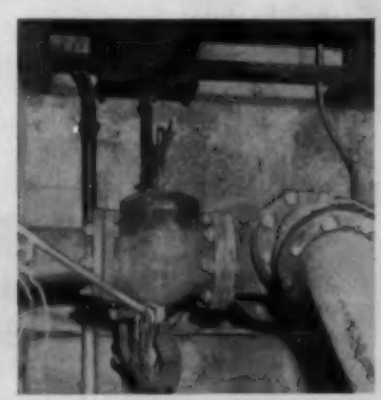
Goyne Pump—Size, 4x6 in; stage, SP; type, volute; gpm, 625; head, 236 ft; rpm, 1,200.

General Electric Motor—Hp, 60; rpm, 1,800; volts, 440; phases, 3; cycle, 60; dripproof; squirrel-cage induction; 40-deg rise continuous.

Westinghouse Life-Line Starter—Magnetic combination; hp, 100; volts, 440; phases, 3; cycles, 60; size, 4; 2-unit pushbutton station, watertight en-



THRUSTER BRAKE operates a dynamic float valve when the motor stops or starts.



DYNAMIC FLOAT VALVE serves to drain line as pump stops.

SLATE BANK 100 ft high filters water before it enters stream. Slate from plant is used to increase height.

EFFLUENT is directed to individual settling ponds by adding or taking off pipe. Note short pipe added to bypass first pond.

SETTLING POND in use after slate bank was made higher. Water filters through bank rather than spilling over.

INACTIVE settling pond filled with solids. Slate bank in background will be made higher before it is used again.

closure, heavy duty, marked "stop-start."

Control Features

Automatic controls feature a maximum-minimum float switch and a dynamic float valve that is operated by a thruster brake.

The float switch is designed to start and stop the pump as the water reaches predetermined levels in the sump.

The mechanism includes a small chain which has two stop-lugs set in the chain and apart from each other, a make-and-break contactor equipped with a lever with a small hole in one end, a float ball and a pulley. The chain is connected to the float ball, passed through the hole in the contactor lever and around the pulley located above the switch. A small weight is connected to the other end of the chain.

As the water in the sump rises and falls, the chain moves up and down and the stop-lugs force the contactor lever to open or close the contacts, thus stopping and starting the pump.

Although the dynamic float switch and thruster brake are not directly associated with the starting and stopping cycle, they do perform a very important operation. This is draining the 2,200 ft of pipe line immediately after the pump stops.

If the effluent is allowed to remain in the line for any length of time the solids will settle out and clog the whole pipe line.

Installation includes placing a 6-in tee in the discharge line next to the pump. The float valve is then connected and enough pipe added to the valve to feed back into the sump.

As soon as power is applied to the motor, the thruster brake closes the valve. When the motor stops the thruster brake opens the valve and the effluent in the line drains back into the sump.

Cost of this system, compared to other methods, is very small. Major cost was the purchase of a pump, motor, starter and pipe. Utilization of the slate banks eliminates constructing settling ponds and at the same time these banks serve a useful purpose.

N. Bentley, superintendent, noting that the system has been in operation 2 yr, describes it as very effective in eliminating stream pollution.

A new O-B Cable Fault Locator!

(in a light-weight, rugged, "pocket-size" package)

Here's the simplest, lightest, most inexpensive, and easiest to use cable fault locator ever offered for mine service!

Designed to pinpoint both short and open circuits in trailing cables having two or more conductors — powerful enough to test cables up to 600 feet long! Complete "pocket-size" package consists of four small, extremely rugged elements which are shipped from the factory — and carried around the mine — in the handy canvas bag shown above.

To operate, simply connect battery and signal generator (about the size of a flashlight) to power end of cable and then move along cable with receiver and headphones as shown above.

Headphones and rugged, all-transistor receiver are only parts carried along cable!

Weighs under four pounds, costs less than any cable you'll use it on!

Write for more information now on the O-B Cable Fault Locator, Cat. No. 22567.

4811-M

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Foremen's Forum

November Cornucopia

In the season of Harvest Home Suppers, we offer the Horn of Plenty. In the cornucopia are fruits that are sweet and some perhaps bitter. We hope you find a juicy Mackintosh.

Bricks, Bricks, Bricks

From the *Manchester Guardian*, by way of *Manage* Magazine, we have this letter from a bricklayer to the firm for which he worked.

"Respected Sir:

When I got to the building, I found that the hurricane had knocked some bricks off the top. So I rigged up a beam with a pulley at the top of the building and hoisted up a couple of barrels full of bricks.

When I had fixed the building, there was a lot of bricks left over. I hoisted the barrel back up again and secured the line at the bottom, and then went up and filled the barrel with the extra bricks.

Then I went to the bottom and cast off the line. Unfortunately, the barrel of bricks was heavier than I was, and before I knew what was happening, the barrel started down, jerking me off the ground. I decided to hang on and halfway up I met the barrel coming down and received a severe blow on the shoulder.

I then continued to the top, banging my head against the beam and getting my fingers jammed in the pulley. When the barrel hit the ground it burst its bottom, allowing all the bricks to spill out. I was now heavier than the barrel so started down again at high speed.

Halfway down I met the barrel coming up and received severe injuries to my shins. When I hit the ground I landed on the bricks, getting several painful cuts from the sharp edges.

At this point I must have lost my presence of mind, because I let go the line. The barrel then came down, giving me another heavy blow on the head and putting me in the hospital. I respectfully request sick leave."

(The moral: Never lose your presence of mind.—Ed.)

Don't Be Cornered

WE SUPPOSE one of the fondest hopes of all supervisors is that worker-foreman relationships will move along serenely in "an atmosphere of sweetness and light." Sometimes, however, they jounce along in a manner that can be best described as "belly-to-belly" interpersonal relations. There are occasions when you, as a supervisor, must stand fast while your adversary crowds you in an attempt to make you back up against your better judgment.

At times like this, it becomes extremely important to keep one's presence of mind. The consequences of losing your grip in this kind of situation can be as devastating to your supervisory position as the bricklayer's lapse was to his physical condition, as described in the preceding item. And you will note that his loss of control occurred only after an extended period of stress, strain and buffeting.

Some fellows (known in the army as the "guardhouse-lawyer" type) take a great deal of pleasure in needling supervisors in the hope of tripping them up. They resent your authority and are blind to your responsibility. For example, they may try to push you to the point of shouting "You're fired!" at them, in the presence of their co-workers. Don't ever do it. Nine chances in ten you will have a major case on your hands, and chances are not better than even that you will win.

Don't let this recital make you suspicious of the loudmouth in your crew; he may be the best man you have. But when you sense the pressure mounting—and you *will* feel it—be cautious. Don't be driven to the point where you lose your presence of mind and shout the fatal words. When you're sure you have reached the brink with the guy, invite him to an interview with the superintendent.

Sputnik Age

An Associated Press story says the German influence in building rockets and guided missiles has inspired a special language, including the following definitions:

Guided Missile—Das sientifiker geschtenwerkes firenkrakker.

Rocket Engine—Firenschpitter mit smoken-und-schnorten.

Liquid Rocket—Das skwirten jucenkind firenschpitter.

Guidance System—Das schteerenwerke.

Celestial Guidance—Das schruballische schtargazen peepenglasser mit komputerattachen schteerenwerke.

Preset Guidance—Das senden offen mit ein pattenbacker un finger gekrossen schteerenwerke.

Control System—Das pullen-undschovenwerke.

Warhead—Das laudenboomer.

Nuclear Warhead—Das eargeschplitten laudenboomer.

Hydrogen Device—Das eargeschplitten laudenboomer mit ein grosse holengraund und alles kaput.

Responsibilities in the field of rocketry rest with top management ('das ultzerbalden grupe), the engineering department (das aufguenfen grupe) and the project engineer (das schwettenoudter).

To withstand this kind of punishment...

Allegheny River Mining Company chose Rome's extra-tough shuttle car cable

No Damaging Bend—Just a *Flip-over.* When flexed in use, Rome's duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, *not* a breakdown. This means that obstructions on the floor of your mine can't put damaging wrong-way bends in this tough cable.

To avoid cable breakdown under severe operating conditions—such as might be encountered in the expedient temporary tie illustrated above—the Allegheny River Mining Company relies on Rome 60 parallel duplex cable.

Here's a cable you can scrape, twist, soak, crush, or bend—Rome's shuttle car cable is built to withstand tough mine hazards.

New integrated design

A rugged Neoprene jacket and the braided conductors are *meshed* together, providing built-in protection against conductor slipping. Greater flexibility arises from an increased number of strands in the ground conductor and power conductors. And a closely woven fibrous covering on the ground conductor minimizes the mechanical working of individual strands.

The sheath, web, power conductors, and ground make up one integrated unit. No matter how you twist or flex this rugged cable, the sheath won't separate from the conductors.

Free sample

Put a two-foot sample length of Rome's shuttle car cable to your toughest test. Ask your nearest Rome Cable representative for your free sample—or write to Department 508, Rome Cable Corporation, Rome, New York.

Visit us in Booth 1504 at the AMC Coal Show in Cleveland, May 13-16

ROME CABLE

CORPORATION

Code for Supervisors

The National Management Association, with headquarters at Dayton, Ohio, offers these guiding principles for professional supervisors:

I resolve to recognize that every man above, beside or below, has an inherent desire to do good work and to be a useful and respected citizen. Until I have considered every possible motive, I will not assume that any man wants to do anything less than his best.

I resolve to keep an open mind on all subjects, and strive to maintain a broad and balanced outlook. I will always be willing to recognize merit in another's ideas.

I resolve to deal fairly with all my associates in the company. I will assume responsibility for my own mistakes and refrain from shifting blame to others.

I resolve to strive to understand the principles of business which make for the success or failure of industry.

I will pass on to my men all the fundamentals of business principles so they can see, for themselves, their own relation to the general scheme.

I resolve to keep informed as to the latest developments in equipment and processes. I will recommend or put into effect such methods as will produce improved quality and lower costs for products, and improve working conditions.

I resolve to realize that one phase of my profession is to help working people obtain maximum satisfaction from life.

I resolve to earn, and carefully guard, a reputation for good moral character, good citizenship and common honesty; and I will support and promote all the uplifting influences of my community.

Dog on the Town

THERE WAS THIS DOG who went out for a night on the town. In passing the local armory, he noted that a dog show was in progress. So he went inside and entered himself in the competition.

As you no doubt have surmised by now, he won the blue ribbon.

On his way home he decided to celebrate his victory. He stopped off at the local pub, and he overdid it.

Later on, at home, his lady dog demanded an explanation for his long absence and his present inebriated condition. He explained what happened and she said, "If that is the truth, where is the prize?"

He said, "I must have left it at the tavern. I will go back and get it."

She said, "Oh, no you won't. We'll send the puppy."

So the puppy went to the tavern and sat upon a stool. The bartender said, "What'll you have?"

"Pap's Blue Ribbon," said the pup.

HERE WE HAVE the Aeroquip Ropelock designed for use with either ⅜-in manila or ⅝-in nylon rope. Its flexibility and . . . **PAY ATTENTION, PLEASE!** Its flexibility and simplicity provide a quick easy method of securing . . . Aw, forget it.

The Hard Boss

William Feather, writing in *Forbes* Magazine, says a good man likes a hard boss. In explaining, Mr. Feather says, "I don't mean a nagging boss or a grouchy boss. I mean a boss who insists on things being done right and on time; a boss who is watching things closely enough so that he knows a good job from a poor one. Nothing is more discouraging to a good man than a boss who is not on the job, and who does not know whether things are going well or badly."

We think that is good advice. The boss is supposed to stay right on top of all developments in his sphere of influence. Training new men in safe, proper methods of working and insisting on better performance from those inclined to be slightly sloppy are big responsibilities in supervision, even though such actions lead the new or indolent ones to rate you as a "hard" boss. If you take a less sincere approach to supervision, you may find the good men losing their sharp edge.

Man Among Men

Recent reports tell of the passing away of Walter Bradshaw in Butte, Mont., at the age of 84. Mr. Bradshaw and a partner, Joe Freethy, set a world hammer and drill record in 1901, when they drove drill steel through 55 ft of concrete in 15 min. This double-jacking record has never been surpassed. He appeared at exhibitions throughout the country, including one at Madison Square Garden, and it is estimated that he won $35,000 in drilling contests. A veritable "John Henry" come to life, Mr. Bradshaw was capable of raining home 80 blows a minute with a heavy hammer.

We presume the art will pass with Mr. Bradshaw. Today's drillers using tungsten-carbide bits and powerful drills may not even own a heavy maul.

Here's MORE efficient driver speed for HEAVY Loads

ALLIS-CHALMERS TEFC Wound-Rotor MOTORS

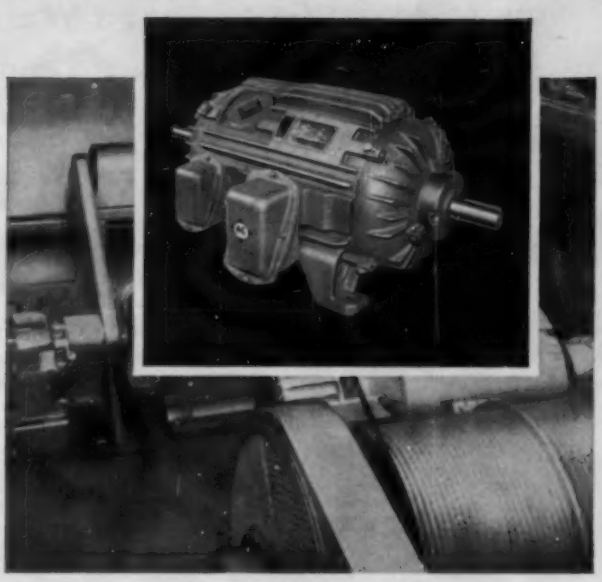
Where high inertia loads must be accelerated quickly and smoothly — yet power supply is limited — the Allis-Chalmers wound-rotor motor proves its efficiency . . .

High starting torque with this motor requires relatively low line-current. In addition, adjustable acceleration and running speed are possible through use of simple controls.

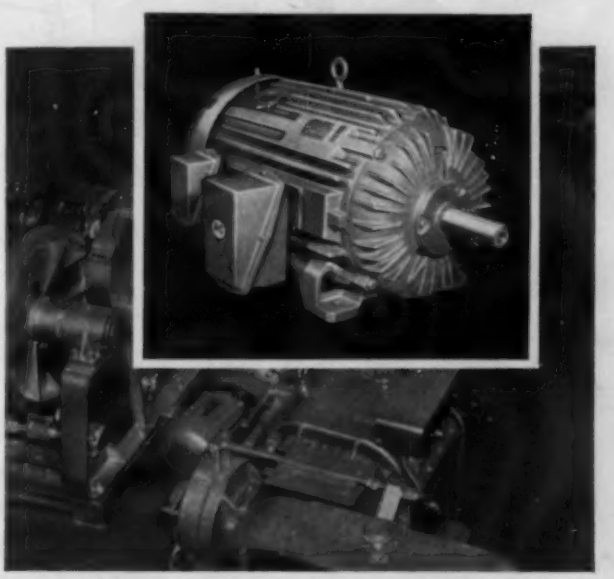
Other features of the TEFC wound-rotor motor include:

1. **Rib construction** provides ample cooling surface.
2. **Single enclosure** surrounds stator, rotor, slip rings, brushes and brush rigging. Gives maximum protection in moist, dirty, corrosive or hazardous atmosphere.
3. **Cast-iron frame** contributes rigid, distortion-free bearing support and keeps alignment true.
4. **Easy access** to collector rings and brushes permits on-the-spot inspection of brushes and commutators.

If you use hoists, lifts, cranes, conveyors, crushers or mills, find out more about the "MORE" in Allis-Chalmers wound-rotor motors. A-C motors also are available in various open types. Contact your nearby A-C sales office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



For intermittent duty, this totally-enclosed, non-ventilated model is available in frame sizes 284 to 505 inclusive. Above 505 frame, Allis-Chalmers offers its famous tube-type motor.



For continuous service, this tough, fan-cooled model is ideal. All enclosed motors can be furnished in standard enclosed or explosion-proof construction rated 55 C rise.

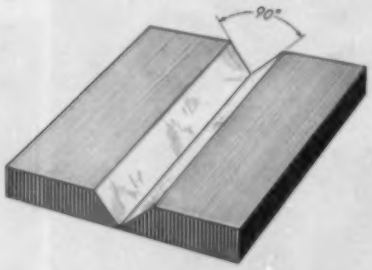
A-5180

ALLIS-CHALMERS

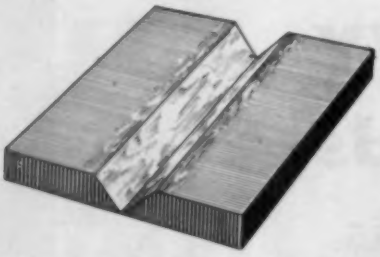
Operating Ideas

How to Make Good Braze Welds

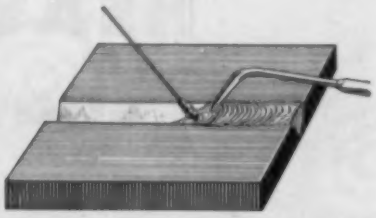
—Linde TIPS, August, 1957



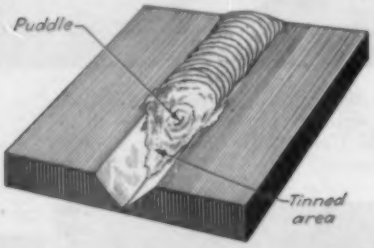
FOR METAL over ¼ in thick, bevel to make an angle of about 90 deg. A coarse file can be used. For heavy sections of cast iron, a grinder wheel will be needed —for steel castings, a cutting blowpipe or gouging nozzle.



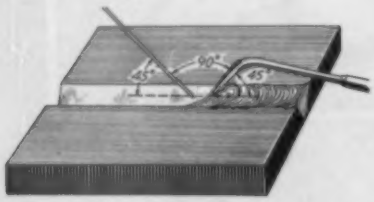
THOROUGH CLEANING is one of the secrets of a good weld. Remove all oil, grease, scale, rust, or oxide from the beveled edges. Clean the top surface ½ in back from the edges. Use a grinder, stiff wire brush, file, emery cloth, or steel wool.



BEVELED SURFACES must also be cleaned by using a liberal amount of flux. Add the flux by dipping the end of the hot rod into the flux can. A flux-coated bronze rod helps, because you are sure of getting exactly the right amount of flux.

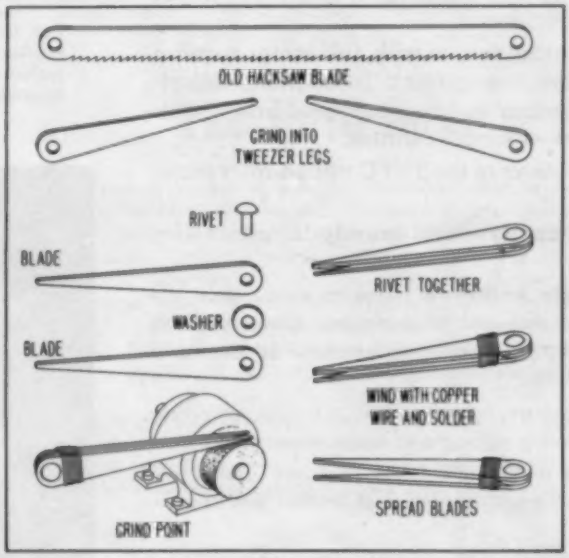


TIN the surface ahead of the main rod deposit when the metal is at the right temperature and thoroughly clean. If the metal is not hot enough, the bronze rod will form into drops. If the metal is too hot, the bronze rod will boil and form into little balls.



POSITION of blowpipe and rod is another secret for making good braze-welds. For a weld in the flat position, hold both rod and blowpipe at an angle of about 45 deg to the workpiece.

ADJUST the flame until there is a slight excess of oxygen. The oxidizing flame has a bluish outer envelope and a shorter inner cone than the neutral flame. There is no secondary flame or feather.

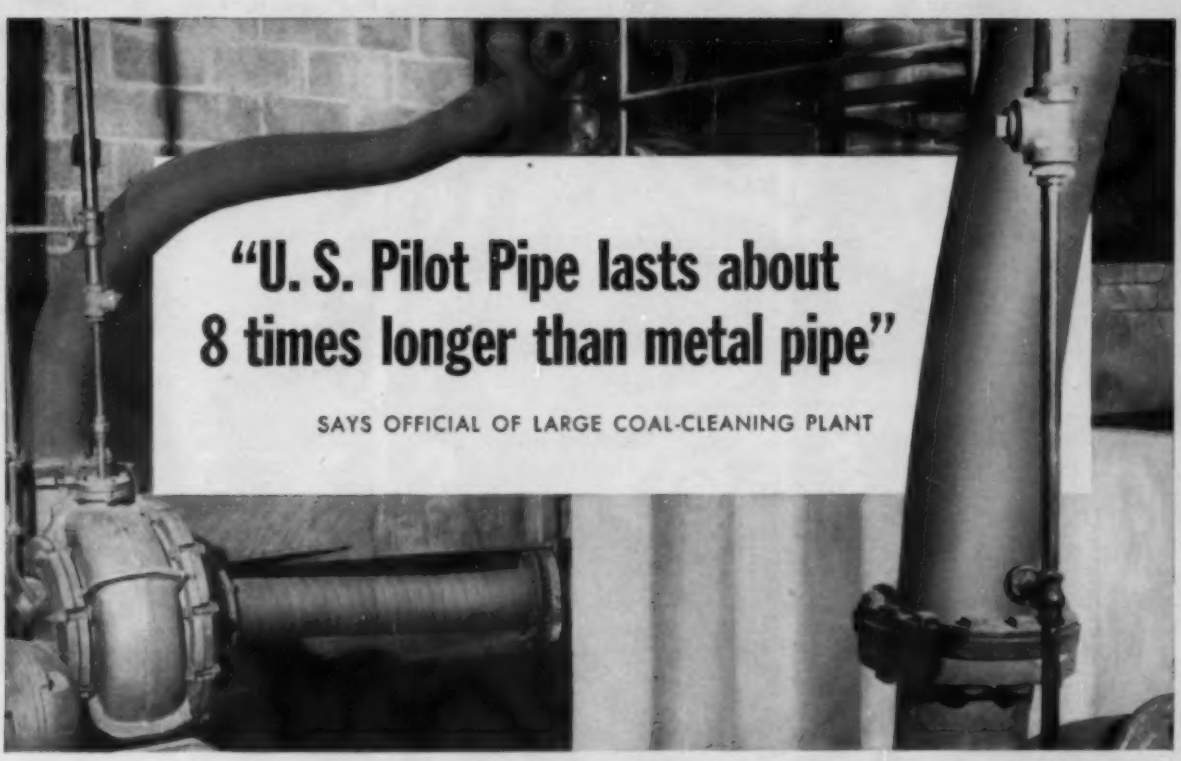


Tweezers From Hacksaw Blade

TWEEZERS are always handy around the shop, especially when working space is limited and parts are small. Good, practical tweezers can be made from old, worn out hacksaw blades, writes Charles H. Willey, Penacook, N. H. The accompanying sketches show how he makes tweezers in his shop.

The first step is to cut the blade in half and then grind the two pieces into tweezer legs. Then place a washer between the legs and join all three with a rivet. Wrap thin copper wire around the riveted end and solder it in place. The final step is to even the legs by grinding them on an emery wheel. If a large pair of tweezers is needed, they can be made from an old band saw blade.

PILOT PIPE



"U. S. Pilot Pipe lasts about 8 times longer than metal pipe"

SAYS OFFICIAL OF LARGE COAL-CLEANING PLANT

A large Eastern anthracite producer uses over 600 feet of U. S. Pilot Pipe to handle one of the most punishing jobs any pipe is ever called upon to do. This pipe is in the coal-cleaning plant where it has to circulate water containing solids (silt, sand, pyrite, refuse). These exert a severely abrasive action on the pipe. Yet, after 6 years of use, the U. S. Pilot® Pipe shows no sign of wear! Officials of the mine say U. S. Pilot Pipe *outwears metal pipe at least 8 to 1.*

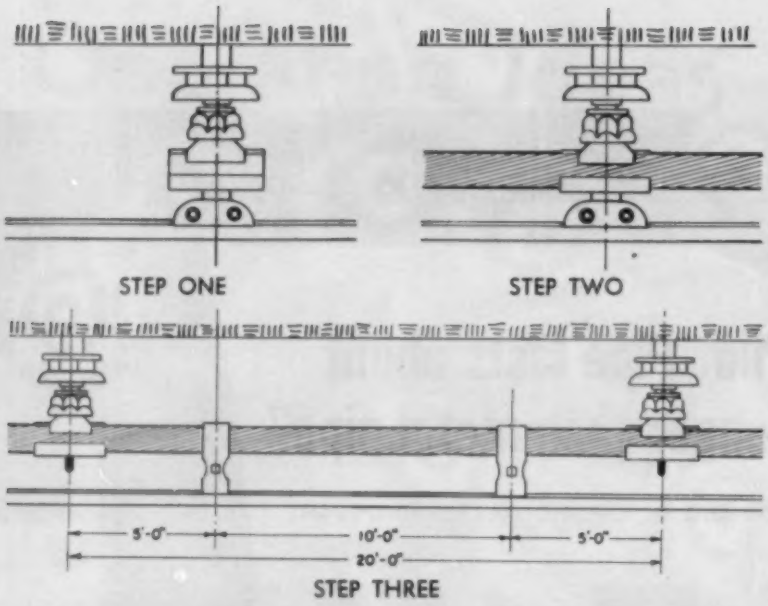
U. S. Pilot Pipe is so flexible that no elbows or short connections are needed. Together with pinch valves it safeguards equipment from the mechanical strain caused by vibration, expansion, contraction and "water-hammer". Available at any of the 28 "U. S." District Sales Offices, or selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Company, Ltd.

Closing valve on section of U. S. Pinch Valve Hose to control flow of abrasive water in preparation plant. Mechanism is compactly designed, can be refitted to new pinch valve bodies.

Mechanical Goods Division

United States Rubber



Improving Feeder-Trolley Installation

IF you are looking for faster, more economical, more efficient methods of suspending trolley wire and feeder, here is a system that should interest you. Published in the June, 1957 issue of *Haulageways*, the system was developed to solve a specific problem. The problem was to design a trolley system that would do the following:

1. Permit trolley wire to be strung long before feeder cable is brought up.
2. Permit feeder cable to be added later on the same fixtures.
3. Result finally in a "cushioned trolley" with all the advantages of smoother current collection and sharply reduced dewirements.

The solution is a three-step process as follows:

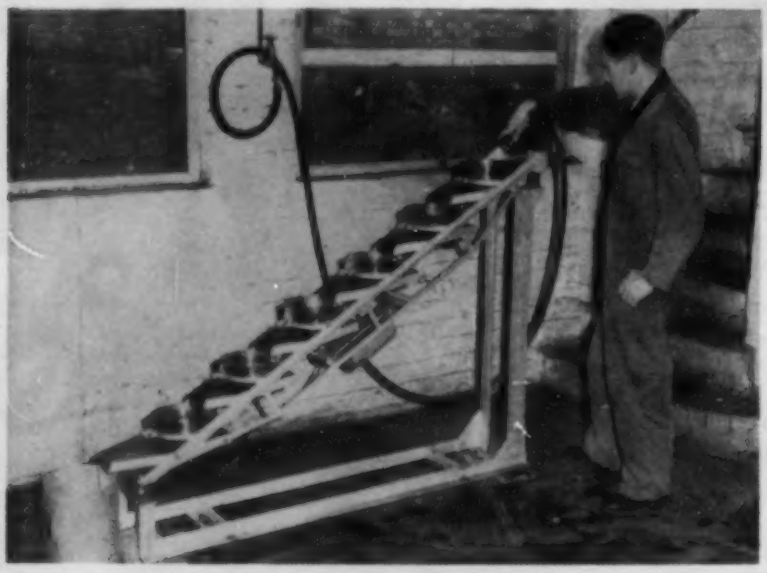
Step 1—The original suspension, on straight-through overhead, consists of an O-B K-3 mine hanger, Bulldog feeder sling with stud, and L-2 hollow-screw trolley clamp.

The trolley wire is strung on the L-2 clamps, while the feeder slings immediately above them remain free for the addition of feeder later.

Step 2—Whenever desired, feeder is strung in the feeder slings.

Step 3—Immediately after putting up the feeder, linemen go from one end of the line to the other removing the L-2 clamps from the original supports and adding O-B combination feeder-trolley clamps to suspend the trolley from the feeder as shown in the sketch.

The result is a "cushioned trolley" throughout the straight-line system.



Cascade Improves Laboratory Sieving

BETTER wet screening of fine sizes is achieved with a cascade-type device designed by J. W. Pettigrew, technical officer in charge of sampling, Central East Area Laboratory, National Coal Board, according to the March 7, 1957 issue of *Colliery Guardian*.

The apparatus consists of a main supporting frame made from welded angle iron. A secondary frame made from 1x1¼-in angle carries the sieves which are held in place by a simple butterfly nut. Stainless steel trays are provided under each sieve to direct the underflow to the next lower sieve. An electro-magnetic variable-pitch vibrator is mounted on a plate welded to the underside of the secondary frame. The sieving frame is attached to the supporting frame by four helical springs, each 1½ in long and fitted at an angle of 30 deg from the horizontal. The unit holds six 8-in sieves.

Before starting a sieving test all sieves of 120 B. S. or smaller are sprayed with water. The sample is poured into the top screen, the underflow being directed by the trays to each lower sieve in turn. If the finest screen is greater than 120 B. S., the vibrator is not used.

Washing is done with a fine water spray connected by a flexible hose to the water supply. When the underflow from the first sieve runs clear the tray is washed clean and the spray transferred to the second sieve. The process is repeated in turn throughout the complete series of sieves.

An experienced operator can complete the sieving of a normal sample through six sieves in 10 min. Slightly over 5 quarts of water is needed.

In the wet screening process a small quantity of material adheres to the meshes and is not washed through. Some of the material falls through during the drying process and is caught in the drying trays. After the drying is completed, the sieves are built into a tier as in normal screening and the material recovered from the drying trays is returned to the top sieve. The test is completed by screening for a few minutes on a dry screening machine.

The new sieving device is said to provide a means of obtaining accurate wet sieving figures for filter cakes slurries, tailings and clays.

Here's what to look for in a Shell and Plug...

1 Two-piece shell of O-B Bail-Type flexes easily, doesn't resist expansion forces created by bolt tension. Result is a quick-setting unit with more useful expansion force per ft./lb. of torque.

2 Three-step taper in O-B plug is designed to take up the slack in the bolt hole fast, develop a powerful "socket" anchorage, prevent high unit stresses at extreme top edge of plug.

3 Horizontal section of expanded O-B unit shows four-way expansion of shell fingers. Four-way distribution of stress permits high loading without distorting plug or pinching bolt threads.

4 Vertical section of expanded O-B unit shows solid "stack-up" of metal in bolt, shell, and plug. This solid metal contributes to superior strength of the socket formed by the plug.

5 Sectioned pieces of expanded O-B unit show heaviest markings in middle or "socket" area of plug. Lighter markings at top of plug prove excellent stress distribution at point of greatest expansion.

6 Section of steel pipe in which O-B unit was expanded for test shows that expansion forces are distributed evenly over all four shell fingers. Serrations on shell fingers make clean sharp impressions.

and here's the place to find it →

OHIO BRASS COMPANY • MANSFIELD, OHIO

In Canada: Canadian Ohio Brass Co. Ltd., Niagara Falls, Ont.

O B

SHELLS AND PLUGS

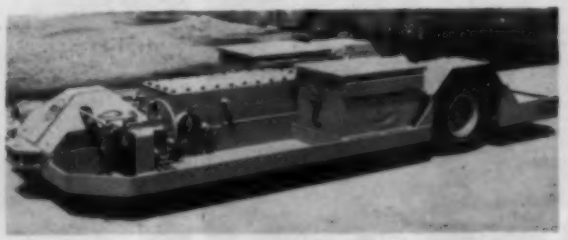
Equipment News

New Front End Loader

That's the "Moto-Loader," Thew Shovel Co.'s first front end loader, pictured above biting up coal. This rubber-tired loader, designated Model ML-153, is available with either gasoline or diesel power. It utilizes an Allison "Torqmatic", 3-speed, power-shifted, full reversing transmission and integral torque converter with a 2.5 to 1 ratio. A new concept of direction control is featured in this machine; two adjacent foot pedals—one for forward travel and one for reverse—give the operator instant direction control, with one foot, while the other foot is used for braking. Besides this, the ML-153 has automatic disengagement of the transmission when the foot-controlled service brakes are applied, the transmission automatically returning to the gear range in which the loader has been working. This, it is declared, allows exact inching of the load and eliminates strain on the drive line components. Thew Co., of Lorain, Ohio, also says that the loader, weighing 19,600 lb with diesel power, and somewhat less with gasoline power, has a low center of gravity giving maximum stability and positive traction at all times, even with a full load.

Rotary Drill

Reich Bros. Mfg. Co., Terre Haute, Ind., announces the new Reich combination rotary and "down-the-hole" drilling machine. The firm states that in rotary drilling, where great down pressure is required to penetrate hard rock, this truck-mounted rotary drill can exert almost 40,000 lb on the bit. It is also declared that extremely sensitive controls enable the operator to apply exactly the right amount of down pressure and rotation speed for maximum penetration by the hammer and bits. Features include "original top-drive," heavy duty jacks, and semi-automatic stem handling.



Battery-Powered Carrier

Shown here is a new battery-powered personnel carrier or utility truck for use in coal mines. This is the latest addition to a similar line of battery-powered machines, designed and produced by the Kersey Mfg. Co., Inc. of Bluefield, W. Va. for 10 yr. The company states that this machine, Model PPC-9, has been tested and approved as safe for use in gassy mines by the U. S. Bureau of Mines.

Side-Dumping Tractor

Caterpillar Tractor Co., Peoria, Ill., announces a new side dumping attachment for Caterpillar No. 933, which will give this type of tractor added versatility without sacrificing efficiency. The company feels that prime advantages of this side dumping bucket are in allowing the "Traxcavator" to perform in-line loading, eliminating the need for constant turning in order to dig and load. This feature will also serve to lower maintenance cost by reducing wear and increase production by

672 holes a day

...two-shift performance of seven RBD-30 Roof Bolting Units at the Island Creek Coal Company

Island Creek Coal Company's #3 Elkhorn Seam in Kentucky averages only 34 inches in height—a real tight squeeze. But not for the CP Roof Bolter! The RBD-30 is only 28 inches high. It moves into low seams, drills at 4 feet per minute, and sets the expansion bolt. On occasion, performance has reached 840 holes a day. Pantograph mounting of drill and bolt-setting motor eliminates need for repositioning. A six-inch auger adjustment on the telescopic chuck overcomes the problem of roof irregularities. Available in self-propelled and standard types—both ideal for low coal conditions. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

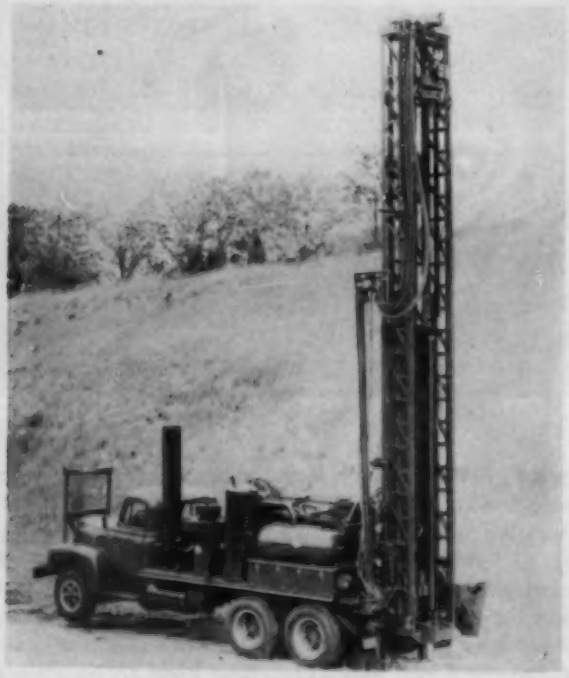
Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

bringing down loading time. Side dumping of the bucket is accomplished by the use of a hydraulic cylinder, mounted on the bucket carriage. The bucket is hinged to the carriage and is firmly locked in place when in the conventional digging position. When side dumping, the operator actuates the hydraulic cylinder by the use of a control lever situated to his right, on the hydraulic tank. The dumping cylinder then unlocks the bucket from the bucket carriage and swings it into a 64-deg side dumping angle to the left only.

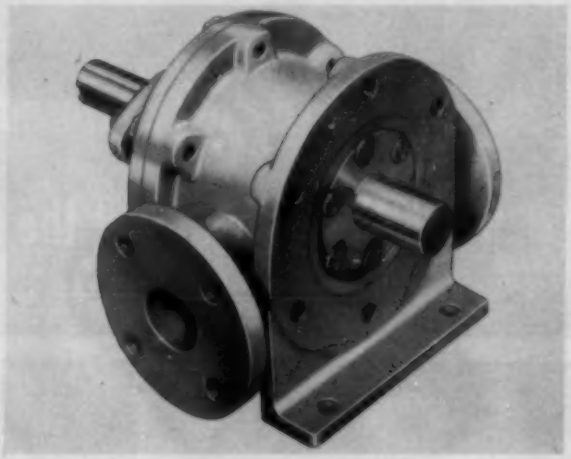
Rock-Dust Distributor

The M-S-A Bantam 400 rock dust distributor is now available with a self-propelling device. The unit, designed for one man operation, has a single lever drive control and a tram speed of 1½ mph with a dead load capacity of 800 lb. The propelling device is available for adaptation to any "Bantam 400." Additional information can be obtained by writing for Bulletin No. 1201-5, Mine Safety Appliances Co., 201 North Braddock Ave, Pittsburgh 8, Pa.



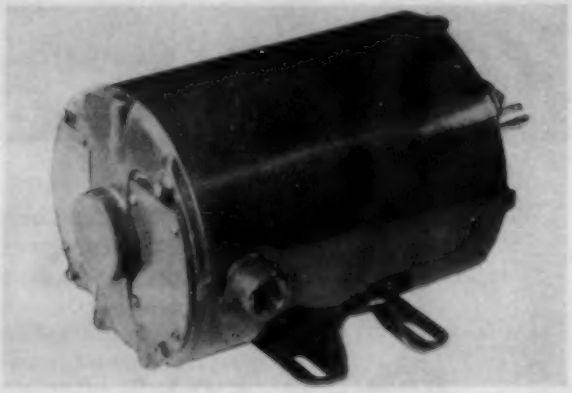
Truck-Mounted Rotary Drill

A new, diesel-powered, truck-mounted rotary drill, shown here, which supposedly makes holes faster and lowers costs on fuel consumption, is announced by Schramm, Inc., 900 E. Virginia Ave., West Chester, Pa. The truck drill, employing a completely separate engine to drive the drilling unit, is said to make holes 600% to 700% faster than is possible with the best churn drilling techniques. Hydraulic pumps, the oil cooling system, and dust collecting fan are all driven by the diesel engine shown in the rear of the truck. For long-distance highway transportation, the mast is lowered but the rig can be moved around quarries or other installations with the mast up. Raised and lowered by hydraulic cylinders, the mast is made of heavy structural steel. It is 30 ft high, with 25 ft travel for 20-ft 6-in drill pipe. Standard rig equipment includes dust blower, primary chip box, hose, dust diverter, discharge stack, pipe rack on side of truck, dual fuel tanks, 65 rpm rotation head, water well holding and drilling slips, and a hydraulic hoist with a special hook for handling drill pipe.



Displacement Pump

Flood City Brass & Electric Co., Johnstown, Pa., has come up with a high-pressure spray or fire pump, through which, particles of coal will pass without damage to the unit. The pump contains a rotating vane which employs stainless steel rollers instead of the usual flat vane type. This, the manufacturer states, eliminates any possibility of coal or dirt particles jamming or damaging the pump. The roller action, similar to that of a bearing, reduces friction and lessens power consumption, according to Flood City Co.



Severe Duty Motors

General Electric's General Purpose Motor Dept., Schenectady, N.Y., has new motors, especially useful where operating conditions are abnormal, such as powering of dairy and food processing equipment and motor installations in the plating

B.F.Goodrich

Three retreads . . . still going strong

20 hours a day, 6 days a week, this truck hauls giant loads of coal over West Virginia and Pennsylvania roads covered with slag and stony shale. It's tire-killing work, yet these B.F.Goodrich Universals have been retreaded *three times* and are still going strong.

Full traction up steep grades

Trucks like this one carry anthracite—coal loads as heavy as 30 tons, up steep roads strewn with razor-sharp rock. But B.F.Goodrich Universal tires give positive traction, and more than 3,500 hours of service before retreading!

Miners get more retreads, better traction, bigger savings with B.F.Goodrich tires!

50% saving The wheels of this truck roll over some of the roughest terrain in the Pennsylvania anthracite region. But their B.F.Goodrich Universal tires stand up so well, they can be retreaded to give an additional 75% of new tire performance. No wonder the operator saves as much as 50% with B.F.Goodrich tires.

REPEATED experiences of miners—like the three shown here—prove that B.F.Goodrich FLEX-RITE NYLON Universal tires give more retreads, superior traction and bigger savings. Reason: the combination of the Universal tread design and the B.F.Goodrich FLEX-RITE NYLON cord body.

Husky, wedge-shaped cleats grip the ground for positive traction. The B.F.Goodrich FLEX-RITE NYLON cord body is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. Result: the B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

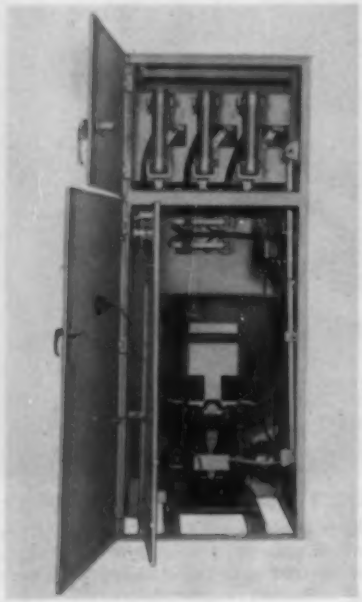
Your B.F.Goodrich dealer has a tire for every kind of mining work. See him today or write: *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, O.*

Specify **B.F.Goodrich tires when ordering new equipment**

B.F.Goodrich
FIRST IN RUBBER

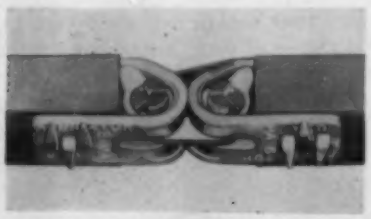
Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

and mining industries which do not require the explosion-proof features. The company cites certain features: stainless steel shaft, cast-iron shields, corrosion resistant finish on internal and external parts, and totally enclosed non-ventilated construction. New motors are available in ratings of ⅛ hp to ¾ hp and in speeds of 3,450, 1,725 and 1,140 rpm.



New Motor Starters

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., has come out with a new line of 2,300 v to 4,160 v starters (Type H) for full or reduced voltage starting, reversing or non-reversing, dynamic braking or multi-speed control of squirrel-cage, synchronous or wound motors. The new starters are available with either air-break or oil-immersed contactors; all components, the company says, are separately tested to provide individual ratings and mechanical strength. In addition, the new machine, said to be compact and versatile, is completely front accessible and offers high short-circuit protection.



V-Belt Fasteners

Alligator aluminum end plate fasteners, made of aluminum alloy, are available for high speed drives. The manufacturer, Kreicker & Meloan, Inc., 221 N. La Salle St., Chicago 1, Ill., declares that because these fasteners reduce the whip of the belt, when belt speed is in the higher range, internal working parts have longer life. The working parts of the fastener are locked in place by means of a special forming of the end plate. When permanently assembled fasteners are used, the rocker pin tool set, used for assembling fastened V-belts, is not needed.

Silent Electric Vibrator

Silence and power are highlights of this redesigned electric vibrator, according to Cleveland Vibrator Co., Cleveland, Ohio. The purpose of the design change, the company states, is to provide a more powerful unit that is easier to handle and install. The new machine develops a maximum vibrating impact of 2250 lb as compared to 1440 lb for the original unit; it is also specified by the firm that the new, silent model, RC-50, has a mounting base which provides better support and better, heavy-duty wiring. The company claims the machine is inherently silent, the only moving part being the rotor. The RC-50 operates on the rotating eccentric weight principle, and can be equipped with adjustable eccentrics permitting vibration impact to be varied between 750 and 2,250 lb. It is recommended by the manufacturer for use on bins, chutes and hoppers for handling all types of dry or viscous bulk material.

Fulljet Spray Nozzles

In the picture you see part of a new spraying system designed by Spraying Systems Co., Bellwood, Ill. The nozzle operates at a spray of 120 deg, offering maximum coverage of pattern areas; this, the company contends, allows better protection in fire control drenching, and greater efficiency in dust control, foam breaking, cooling, and chemical processing.

Aquadyne System

Aquadyne Co., 89 Terminal Ave., Clark, N.J. says that its multiphase wetting system is scientifically formulated to reduce the interfacial tension of ordinary water and to increase the wettability of all types of dust and powdery materials. A special capsule is introduced into the system's "Hydroblender" and dissolved in water sprayed at high pressures. The system can be mounted at any convenient location by four lag bolts or screws. Uses for the system are dust control, product wetting, blending, mixing and washing at mining properties.

Vehicular Desk

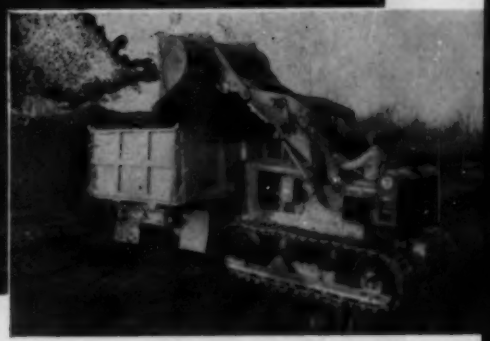
Patent is pending on this flexible, 8 in by 12 in aluminum constructed desk, which may prove to be a boon to truck drivers, pickup men, and others engaged in mobile work where a handy writing surface is needed. The desk, containing also a 1 in basket to hold papers, attaches to the dashboard of any standard vehicle and has full, 90 deg up and down maneuverability. Product Development Corp., P. O. Box 789, Norwalk, Conn., reports that the handy gadget has already been ordered by airlines, trucking firms, taxicabs, police cars, sales fleets and passenger cars.

Self-Cleaning Pulleys

Van Gorp Mfg. Co., Inc., Pella, Iowa, announces a new, steel self-cleaning conveyor pulley, available in 3,000 standard sizes. The manufacturer states that the pulleys offer the most modern method of installation, employing Dodge "Taperlock" bushings. The self-cleaning highlight, it is declared, insures longer belt life, eliminating material building-up between belt and pulley and preventing belt misalignment. Van Gorp Mfg. Co. have also added a special order department for custom built pulleys.

Directional Control Valves

Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio announces the VDP2, one of a new line of hydraulic directional control valves for earth moving, material handling, agricultural and



With 2¼-cu yd bucket, the TD-14 puts a 12-ton load of coal on a truck in a matter of minutes. Without "overdoing" operator or equipment, this size of Skid-Shovel can easily load up to 135 tons of "shot" coal per hour —in average conditions.

HOW INTERNATIONAL DROTT TD-14 SKID-SHOVEL

adds cost-cutting mobility to coal-stripping!

—for Howard Coal Company, Caryville, Tennessee

Here's what Lee Powers, partner in Howard Coal Company, Caryville, Tennessee, says about the firm's TD-14 Skid-Shovel performance:

"Pry-action and bucket roll-back of the Skid-Shovel give work-speeding digging force. Maneuverability is a big feature, too. The TD-14 can go where a (boom-type) power-shovel can't reach."

Exclusive International Drott *triple-power pry-action break-out*—plus 42° ground level roll-back—gives you amazing "slate-shattering" digging force, and bucket-heaping action. Exclusive shock-swallowing Hydro-Spring protects the equipment—adds operating comfort!

And quick, *go-anywhere* all-weather traction teams with positive, easy, "turn-on-its-heel" maneuverability.

That's why this International Drott TD-14 Skid-Shovel, for example, is an ideal "help-out" unit for big dozers and big dippers—besides providing a big-capacity coal-loading unit.

See for yourself how an International Drott can often outspeed, outreach, and outproduce boom-type equipment. Look at the exclusive International Drott Four-In-One—now available in four sizes, 1-yd to 3-yd capacity. Note how the Four-In-One gives you 4-machine utility: *bulldozer, Bullclam, clamshell,* and *Skid-Shovel*—for one moderate investment. Ask your International Drott Construction Equipment distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

. . . by skilled, experienced machinists, is a big factor in the consistent high quality of PENN PARTS. Richard E. Pearce, for example, who is shown here setting a cutter to mill worm threads, has been with us for 35 years, and 40% of our men have been with us more than 20 years.

We make a full line of replacement parts for all mining machinery—more than 4,000 different types and sizes. We carry more than 60,000 parts in stock, ready for immediate shipment by rail, air or our own trucks.

The next time you need replacement parts, call us. Then let the service of those parts tell its own story.

PENN MACHINE CO.

JOHNSTOWN, PA.

Mt. Hope, W.Va. | Union Trust Building, Pittsburgh, Pa. | Huntington, W.Va.

Equipment News *(Continued)*

other mobile equipment. The firm states that the valve is engineered to provide excellent metering characteristics in raising, positioning, rotating, holding or lowering operations and features exceptionally low pressure drop.

Equipment Shorts

SINGLE-SCALE MEGHOMETER – Keithley Instruments, Inc., Cleveland, Ohio, is boosting this meghometer, which, they say, will speed production testing with its improved accuracy and fast response. According to the firm, the instrument measures six decades of resistance on a single 6-in mirror scale and has 5 to 10 times faster response than conventional ohmeters. Some features offered are: elimination of range-switching; a linear scale with no compression at the high end; negligible drift; simple operating controls; and a completely shielded input. The megohmeter has 5, 50, and 500 v tests potentials, providing a wide range of safe voltages for measuring all test samples and for checking voltage coefficients.

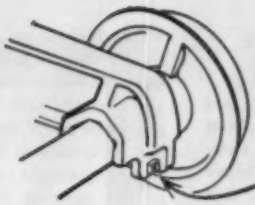
NEW MERCURY LAMPS–Four new 1000-w mercury lamps which provide nearly 5% more light than previous lamps of this type, according to officials of General Electric Co., are available. Engineers of the firm say that application of a special phosphor internal coating has produced one of the most efficient 1000-w mercury light sources ever made.

"YOLOY" PRODUCTS – Youngstown Sheet & Tube Co., Youngstown, Ohio, offers two new products made with "Yoloy" steel, which, it is advanced, is far more resistant to corrosion than other steels. The products, conduit and electrical metal tubing, are designed for use in places where corrosion is more severe than normal. The special steel is a nickel-copper, open hearth steel made by Youngstown Sheet & Tube Co. for more than a quarter of a century.

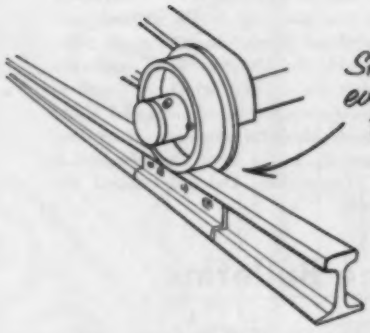
CONVEYOR LUBRICANT – Lehigh Chemical Co. of Chestertown, Md. recently made known development of an extreme high temperature oil-Anderol L-825-designed for use on conveyor belt operations where operating conditions and temperature ranges require an exceptionally versatile lubricant. According to the firm, the oil, developed after years of research in jet engines, has an operating range up to 500 deg F continuously and over 600 deg F for short time intervals.

LIFT BLOCK–General Machine & Welding Works, Inc., Pomona, Cal., has

Movement between bolster and side frame is taken on specially designed wear surfaces

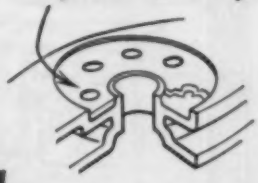


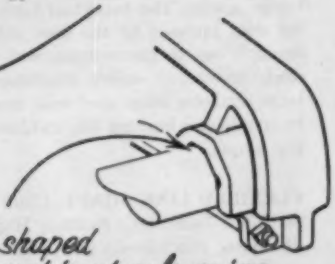
Quick wheel change



Smoother ride even on rough tracks

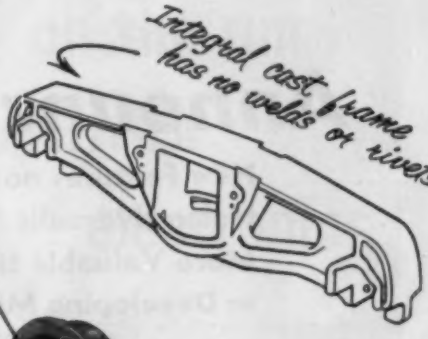
Large center bearing for longer life





V-shaped machined axle grips for controlled flexibility and truck alignment

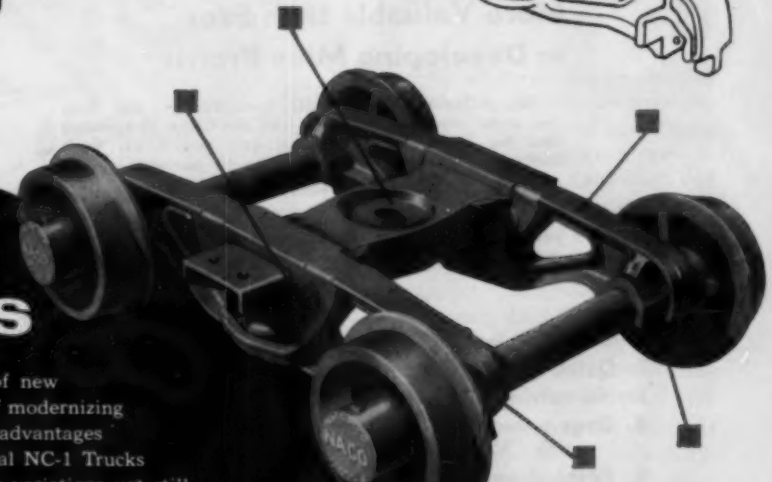
Integral cast frame has no welds or rivets



Check these "plus" features

OF

NATIONAL NC-1 TRUCKS



If you're considering the purchase of new 8-wheel mine cars . . . or if you're thinking of modernizing older cars—*now* is the time to check the advantages of National NC-1 Trucks. National NC-1 Trucks have controlled flexibility for track variations yet still maintain truck alignment through their machined V-shaped axle grips. In addition, NC-1 Trucks have a built-in shock absorbing mechanism.

You get more out of your mine car investment per workshift . . . per day . . . per year. And at the same time you minimize spillage . . . get greater protection for your equipment, track and structures . . . slash maintenance to a new low.

Yes, *now* is the time to check National NC-1 Trucks—they make sense for 8-wheel mine cars . . . *make dollars for operators*, too.

- WILLISON AUTOMATIC COUPLERS
- RUBBER CUSHIONED UNITS
- NC-1 CAR TRUCKS • NACO STEEL WHEELS
- NACO STEEL LINKS & SWIVEL HITCHINGS

AA-8017

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 *Cleveland 6, Ohio*

Equipment News *(Continued)*

a new lift block and bearing hook. It is especially designed for traveling and bridge cranes. The important facts about the item, stressed by the firm, are extra strength due to construction with heavy steel, bronze or roller brushings, and large diameter alloy steel heat treatment to give longer bushing life and low starting torque.

FLEXIBLE LINK SHAFT—Clark Flexible Link Shaft Co., Newton Highlands 61, Mass., announces a new flexible shaft with equal torque in both directions, unlimited length, and equal flexibility in all sizes. The links consist of trunnion blocks and two half links fastened together with screws or rivets, and various link lengths can be combined in one shaft using long links for straight runs. Crediting long life to the shafting, the manufacturer says that its product has operated continuously for 7,000 hrs at 900 rpm without attention or maintenance.

NEW TOWING TRACTOR—The new "Paymover," a two-wheel drive tractor with 5,000 lb drawbar pull, is, according to Frank G. Hough Co., Libertyville, Ill., compact and maneuverable. It features torque-converter drive and automatic transmissions, which, it is said, are ideally suited to industrial tractor-trailer operations, or rail and motor truck terminal and stevedoring operations.

PORTABLE WAREHOUSE — Everything is nice and snug inside the pneumatic shelter pictured here. The coated fabric was anchored to the ground, and a centrifugal blower maintains air pressure inside the structure. The engineers feel that the shelter, which is weatherproof, lightweight, translucent and easily set up is ideal for low-cost, short-term storage. E. I. Du Pont De Nemours & Co., Wilmington, Del., developed the product.

Announcement

New Features now make the Nolan Hydraulic PORTA-FEEDER More Valuable than Ever in Developing Mine Profits

The NOLAN HYDRAULIC Porta-Feeder will help you meet every requirement and condition in spotting cars for loading from shuttle cars and belts. Push button control or fully automatic with automatic gate.

There are hundreds of NOLAN Feeders in operation.

There are some in your vicinity—ask us to show you how efficient NOLAN equipment can be in your operation.

NEW FEATURES

1. Only 60" longer than the mine car
2. Quick change dogs
3. No valving or piping used on the track unit
4. Dogs operate on close centers for mounting mine car with "V" section draw bar
5. Pushbutton control from both sides of loading point with motor control switch
6. Removable wear slides
7. Automatic lubrication
8. Simple trouble-free valve arrangement on power unit
9. Cushion spring anchor and spring cushioned dogs
10. Quick positive stroke adjustment

NOLAN

THE NOLAN COMPANY

Pennsylvania Street • Bowerston, Ohio

NOLAN SALES AGENTS

George C. Hutchinson, Jr., 1304 Koppers Building, Pittsburgh, Pa.
Huntington Supply & Equipment Co., Huntington Nat'l Bank Bldg., Huntington, W. Va.
John Lloyd & Sons, 23 Bennett Bldg., Wilkes-Barre, Pa.
E. C. Horne Machinery Co., 1726 Champa Street, Denver 2, Colorado.
Frank C. Hammett, P. O. Box 154, Castle Gate, Utah
Amos A. Culp, 429 South 24th Street, Birmingham 5, Alabama
John North Associated, P. O. Box 185, Herbert, Michigan (Chicago District)

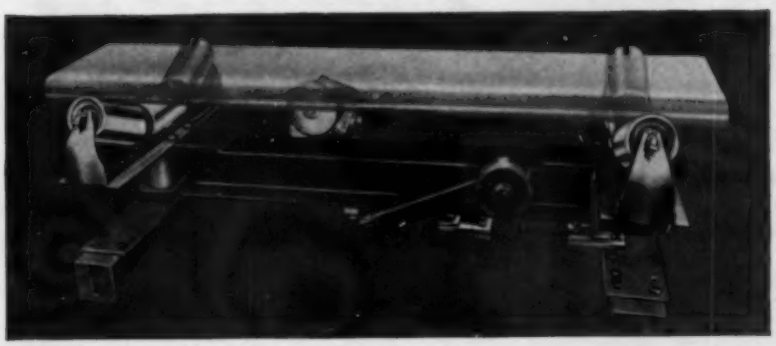
Free Bulletins

SAFETY EQUIPMENT—Mine Safety Appliances Co. is distributing two folders, the first describing a portable machine for discharging a mixture of rock dust and water in bituminous coal mines for on-shift rock dusting. The machine, it is said, is capable of dusting 80 lineal ft of mine entry with one 400-lb batch of slurry, and is fully explained in the pamphlet. A second folder illustrates and describes a two-way loud-speaking system, the efficiency of which, the company says, will result in additional safety in the mine. Address request to Mine Safety Appliances Co., 201 North Braddock Ave., Pittsburgh 8, Pa.

AIR COMPRESSORS—Three new pieces of literature describing the entire line of Westinghouse unit-type and Le Roi stationary air compressors have been issued. The compressors illustrated and analyzed range in size from 1/2 to 100 hp, and specifications are also listed. The material may be obtained from Sales Promotion Dept., Le Roi Div., Westinghouse Air Brake Co., Milwaukee, Wis.

VIBRATING SCREEN — Stephens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Ill., is making available an 8-p brochure with comprehensive technical information and illustrations on a new S-A vibrating screen. The firm says that the bulletin should be of special interest to bulk material handlers engaged in screening, scalping and washing crushed stone, gravel, ore, coal and other bulk material in which various lumps are to be separated into specific sizes.

TIMING INSTRUMENT—The John W. Hobbs Co., a division of Stewart-Warner Co. has a new folder, No. 600, describing the Hobbs engine hour meter, a precision-built, true-timing instrument, which shows at a glance the actual



Weigh it on the run ...with electronics

There are no labor costs to be charged against weighing when you incorporate a Fairbanks-Morse electronic scale in your belt conveyor system. The belt will be moving anyway, and might as well be accumulating the record of passing weight in the process.

Because it is electronic, the registering instrument of the new Fairbanks-Morse Electronic Belt Conveyor Scale can be located remotely—for instance in the office with the rest of your business and accounting machinery.

Accumulated weights are read on the remote instrument in digital figures, and there are other indicators to give you a running check on the general efficiency of your conveyor operation. A meter shows percentage of load at the given moment; another shows the rate of tonnage movement per hour.

There's a new bulletin, No. ED-12, on the Fairbanks-Morse Electronic Belt Conveyor Scale. Please write for it today. Fairbanks, Morse & Co., Dept. CA-11, 600 South Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Equipment News *(Continued)*

hours and minutes of engine operation. All the "whys" and "wherefores" are covered in the folder. The company feels the machine will be of great value in measuring utilization of equipment. Write Stewart-Warner Co., 1826 Diversey Pkwy., Chicago 14, Ill.

SHOVELS, DRAGLINES, CRANES—A booklet describing Model 3000 series of 2-yd shovels, draglines and 40-50 ton cranes has been published by Manitowoc Engineering Corp., Dept. MRS, Manitowoc, Wis. The booklet explains engineering features, which, the firm feels, gives the Manitowoc Model 3000 more power and versatility with less maintenance downtime than any other shovel, dragline or crane in its class.

CENTRIFUGAL PUMPS – The Allen-Sherman-Hoff Pump Co., 259 E. Lancaster Ave., Wynnewood, Pa., offers a new brochure of technical data to replace tables of figures with simple nomograph charts as easier aids in selecting the proper types and sizes of pumps. Besides giving outline dimensions of its various pumps, the brochure also offers advice on proper construction of sump chambers.

ROTARY COMPRESSOR—A new bulletin, descriptive of its Model 125 rotary compressor, has just been issued by Davey Compressor Co. Unit illustrations, complete specifications and a rotary compression cycle diagram are bulletin features. Write Davey Compressor Co., Kent, Ohio, for Form No. E-267.

STANDARD EQUIPMENT—The Precision Equipment Co., 4411C Ravenswood Ave., Chicago 40, Ill., offers free copies of their new catalog which lists countless kinds of standard office, factory, warehouse and maintenance equipment, and introduces new products which have recently been devised as an aid for executive planning. Two new products, of which the company boasts, are "Airo Spray" open gear spray lubricant and spray penetrating oil in handy aerosol cans which end waste and shorten application time.

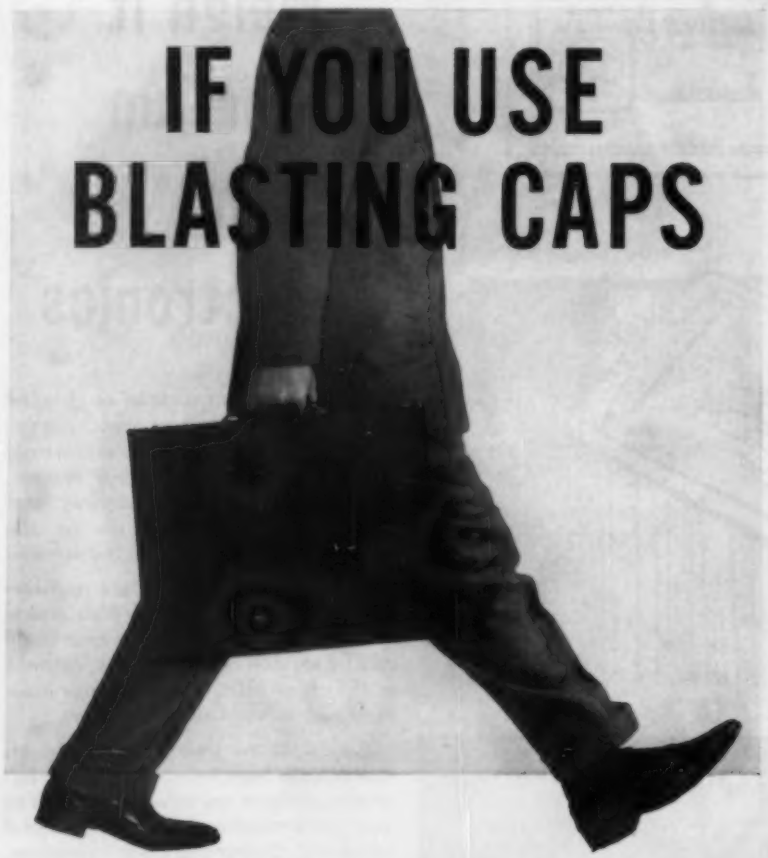
V-BELTING—Informative literature is available on the Boston roll lot V-belting. Detailed specifications and data include length tables for endless V-belting replacements. Write Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.

HARD-FACING ELECTRODES – Copies of a new brochure which describes the chemical composition, some properties, typical applications, and packaging for 12 Haynes alloys available as electrodes, are ready for distribution. Address requests to Literature Distribution Section, Haynes Stellite Co., Div. of Union Carbide Co. 30-20 Thompson Ave., Long Island City 1, New York.

CARBIDE TOOLS—Firth Sterling Inc., 3113 Forbes Street, Pittsburgh 30, Pa., announces a new 56-p catalog on carbide tips, tools and inserts. A picture index easily identifies each product and a complete grade selection chart is included.

CATALYTIC EXHAUST PURIFIERS—A booklet entitled "Exhaust Fumes Are Poison" has been published by Oxy-Catalyst, Inc. It points out the deleterious effects of carbon monoxide and exhaust fumes, and provides all the technical data on how three types of catalytic purifiers combat this problem. Exhaust purifiers were introduced by Oxy-Catalyst, Inc., in 1950. Write Oxy-Catalyst, Inc., Wayne, Pa.

DIESELS & APPLICATIONS—Diesels and their applications is the subject covered in a new bulletin, No. 111, offered by White Diesel Engine Div.,



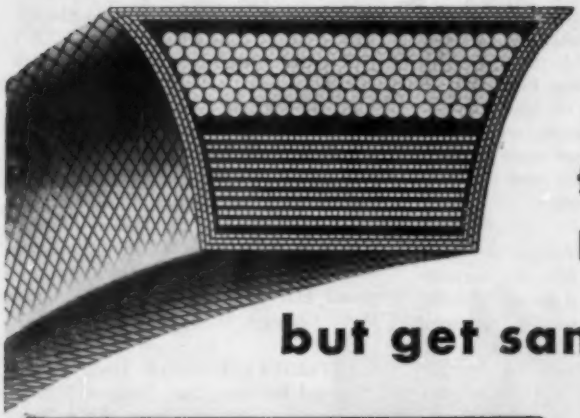
WELCOME THE MAN WITH THE RED VALISE

Explosives Department
HERCULES POWDER COMPANY
900 Market Street, Wilmington 99, Delaware

XR57-6

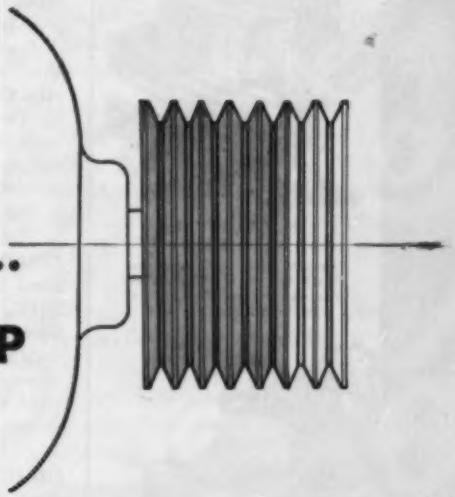
See Details in our Ad on Pages 114-115

5 Gates Super Vulco Ropes do the work of 7 standard V-belts



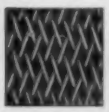
Use fewer belts...

but get same HP



No other V-Belt has ALL these advantages

1. Flex-Weave Cover (U.S. Pat. 2519590)



A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

2. Concave Sidewalls (U.S. Pat. 1813698)

Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Tough, resilient Tensile Cords

Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required save weight and space.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

Cut sheave width and weight . . . design your drive to benefit from the greater HP capacity of Gates Super Vulco Ropes.

5 Gates Super Vulco Ropes will do the work of 7 Standard V-Belts. A Super Vulco Rope Drive delivers more HP per dollar invested than any standard V-Belt drive.

Sheaves with fewer grooves cost less . . . weigh less . . . occupy less space. Your drive design is improved.

Helpful drive data is quickly available to you. Simply call your nearby Gates distributor for advice from a Gates V-Belt Specialist. Stocks carried in industrial centers throughout the world.

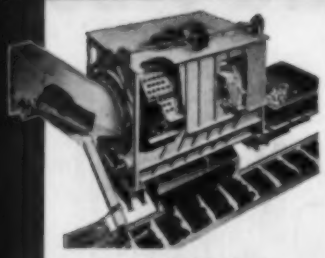
The Gates Rubber Company
Denver, Colorado

TPA 264

Gates — The Mark of *Specialized* Research

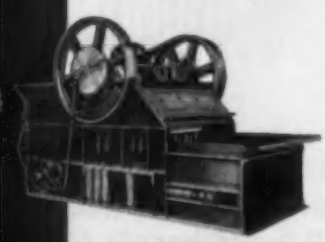
Gates Super VULCO ROPE Drives

America's most complete line of CRUSHING EQUIPMENT



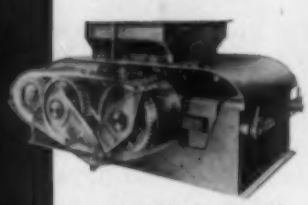
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.

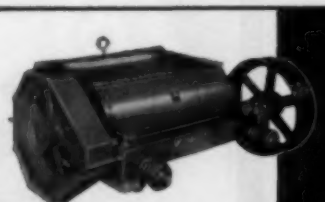


McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

White Motor Co., Springfield, Ohio. Included in the 8-p, two-color bulletin are product photos, construction feature illustrations, specifications, and performance curves.

SHAFT MUCKING GRAPPLE – The Joy JPG-200 pneumatic grapple for shaft mucking is the subject of new bulletin, No. 4-1, available from the Joy Mfg. Co., Oliver Building, Pittsburgh 22, Pa. Details are given on operation and application of the grapple, which, it is said, is adaptable to most types of shafts; schematic drawings show how it is used in several types of shafts.

PUMPING UNITS—Sprague & Henwood Inc., 221 W. Olive St., Scranton 2, Pa., have announced their 8-p folder illustrating and discussing pumping units for soil sampling, core drilling and pressure grouting. Bulletin No. 370 also gives specifications on the various machines available.

DIESEL POWER UNITS – International Harvester Co. describes its line of six diesel power units in a new 12-p pamphlet. Diagrams, cross sections and photo close-ups give the inside story on the three 4-cyl units, the UD-281, UD-350, and UD-14A, which range in hp from 60 to 76, and on the more-powerful 6-cyl jobs, the UD-525, UD-18A, and the UD-1091, which embrace a wider range of power, from 115 to 200 hp. Send for Catalog CR-509-G, Construction Equipment Div., International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

DUST FILTER—The Day Co., 810 Third Ave. N.E., Minneapolis 13, Minn., offers a booklet filled with facts about a reverse-jet dust filter, which, they feel, is ahead of the field in the dust filter industry. The 28-p booklet not only gives the details about the filter, but also outlines Day Co. helps and aids in solving plant dust control problems.

HAULERS & EARTHMOVERS – "Colorful" and "chock-full of on-the-job photos" is International Harvester Co.'s description of two new pamphlets which tell the story of off-highway haulers and earthmovers. The publications available contain all the information about the equipment and describe their uses and advantages. For copies of the booklet on earthmoving equipment ask for catalog CR-542-G; for the hauler information ask for catalog CR-603-G. Write Construction Equipment Div., International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.

BATTERIES – Industrial Div., Gould-National Batteries, Inc., Trenton 7, N.J., has issued a revised edition of the "Battery Users Manual." The 44-p book is designed to help plant engineers, superintendents and foremen to conduct an organized battery training course in their own plant. Copies of this bulletin, No. GB-1599A, may be obtained free, upon request.

EQUIPMENT CATALOG—110 different products for safety, maintenance and production are described in Martindale Electric Co.'s new folder. The 64-p book is well illustrated, and includes complete information for selecting and ordering metal-working tools, motor and generator maintenance equipment, and other electrical and mechanical maintenance products. The address is Martindale Electric Co., 1307 Hird Ave., Cleveland 7, Ohio.

METHANE TESTER—This is the name of Mine Safety Co.'s newest detector of polluted air. The tiny instrument, which the company says can be carried in the pocket, will detect small concentrations of methane in the air, and is fully explained and analyzed in bulletin No. 0809-3, which can be obtained from Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

CARBON BRUSHES—General Electric Co. offers a booklet designed as an aid in getting the best performance out of carbon brushes. It is based on a question-and-answer interview with George H. Gunnoe Jr., an expert on commutation problems, and it covers brush life, metal transfer, commutator threading, bar marking, and commutator adjustment. General Electric Co. headquarters address is 1 River Road, Schenectady 5, N. Y.

½ DAY LOST IN 8 YEARS

Since he switched to a "Jimmy" Diesel

Working up to 9 hours a day, 6 days a week, in Robert Bailey's strip mine near Morrisdale, Pa., this General Motors Detroit Diesel-powered shovel has had total down-time of only *one-half working day in 8 years' operation.* Because of the dependable service and economy of this "6-71" engine, Bailey swung to GM Detroit Diesel power—now operates 9 units on generators, in tractors and in another shovel.

Does it pay to standardize on GM Detroit Diesel power? It sure does. For it simplifies your servicing and parts requirements. And, with power at *every* piston downstroke, these fast-stepping 2-cycle Diesels get more work done at less cost on any job.

You can have GM Detroit Diesel power (single engines, 30 to 300 h.p.; multiple units, up to 893 h.p.) in over 1,485 different applications of power machinery. For the list, see your GM Detroit Diesel distributor or dealer—or write us direct.

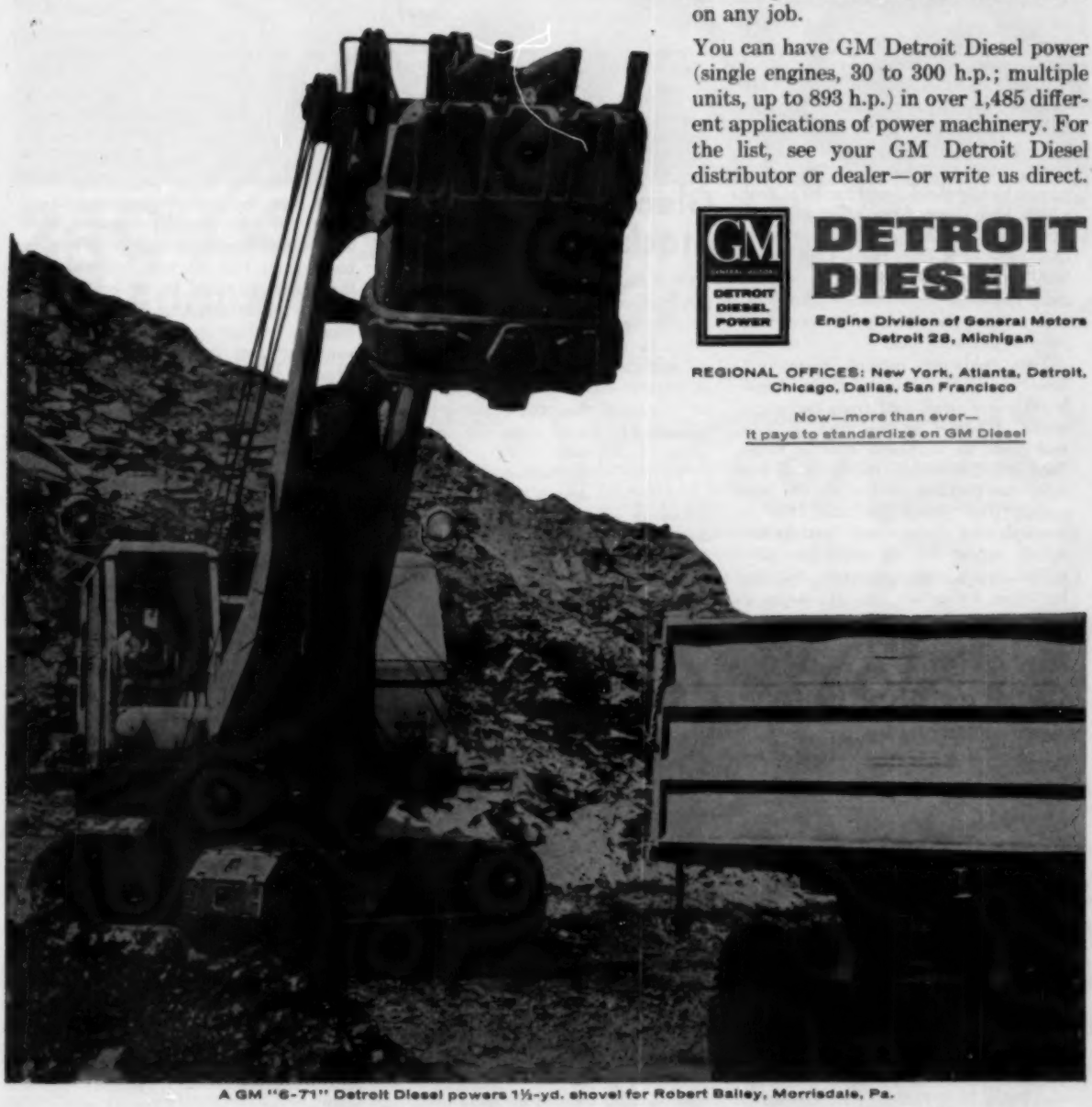
GM DETROIT DIESEL POWER

DETROIT DIESEL

Engine Division of General Motors
Detroit 28, Michigan

REGIONAL OFFICES: New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

Now—more than ever—
it pays to standardize on GM Diesel



A GM "6-71" Detroit Diesel powers 1½-yd. shovel for Robert Bailey, Morrisdale, Pa.

News Roundup

Britain May Reduce U. S. Coal Imports

Complaining that money paid for imported coal last year had completely wiped out Britain's gain on motor vehicles exported to North America, Lord Mills, English Minister of Power, declared in a speech that the situation had become urgent. Exporting cars is one of the country's biggest businesses, and presented with total depletion of values from that industry, Mills indicated that coal imports would have to be slashed.

Britain's coal problem is, briefly, this. Though the country is rich in coal, householders there prefer large coal—generally defined as coal more than 2 in in diameter. Coal producers in Britain cannot handle the demand for large coal, which also stems from railways there. Thus, some $70 million worth of coal, most of it from the United States, was imported into Britain last year to meet the large coal demand. Imported coal sells at the same government-fixed price as domestic coal.

Two solutions present themselves. Imports could be lowered if the people begin using small coal from the ample stocks at home; or the price of large coal could be increased in order to reduce losses. Evidently, for political reasons, the government has shrunk from raising coal prices till now, but as demands for large coal has grown, British output fell off at a rate of 2 million tons a year. Apparently, the time has come for action.

Importers Warned On Residual Oil

The pot of problems on residual oil is bubbling. Capt. M. V. Carson, Jr., Dept. of Interior, warned importers, recently, to keep their imports within limits set by the voluntary oil import program. Saying that things were under close scrutiny, he warned that a program similar to the one existing for crude oil would be invoked if quotas on residual oil were circumvented. Capt. Carson also indicated that little deviation from the crude import quotas can be expected, despite the requests of Standard Oil of Indiana, Tidewater Oil Corp. and others for increases in import limits. The biggest bomb thrown was authorization by the Dept. of Justice of a Federal grand jury investigation of fuel oil distribution, designed to get facts on various people, firms and corporations engaged in the distribution of fuel for heating.

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Glen Alden Corp. Stock Negotiations

Glen Alden Corp., the nation's biggest producer of Pennsylvania anthracite, is considering an offer by List Industries Corp. to pay $12.50 cash a share for the coal corporation's stock if a minimum of 350,000 shares were deposited. Interest mounted due to a statement by Francis O. Case, president of Glen Alden, as follows:

"In line with further diversification, List Industries desires to become a stockholder in our company. Your management feels that it is desirable to have a company with the reputation and financial strength of List Industries associated with us."

List Industries, active in theater business, would acquire 20% of the outstanding shares of Glen Alden, the largest single block of voting stock, though not a controlling interest.

Contracts For Steam Units

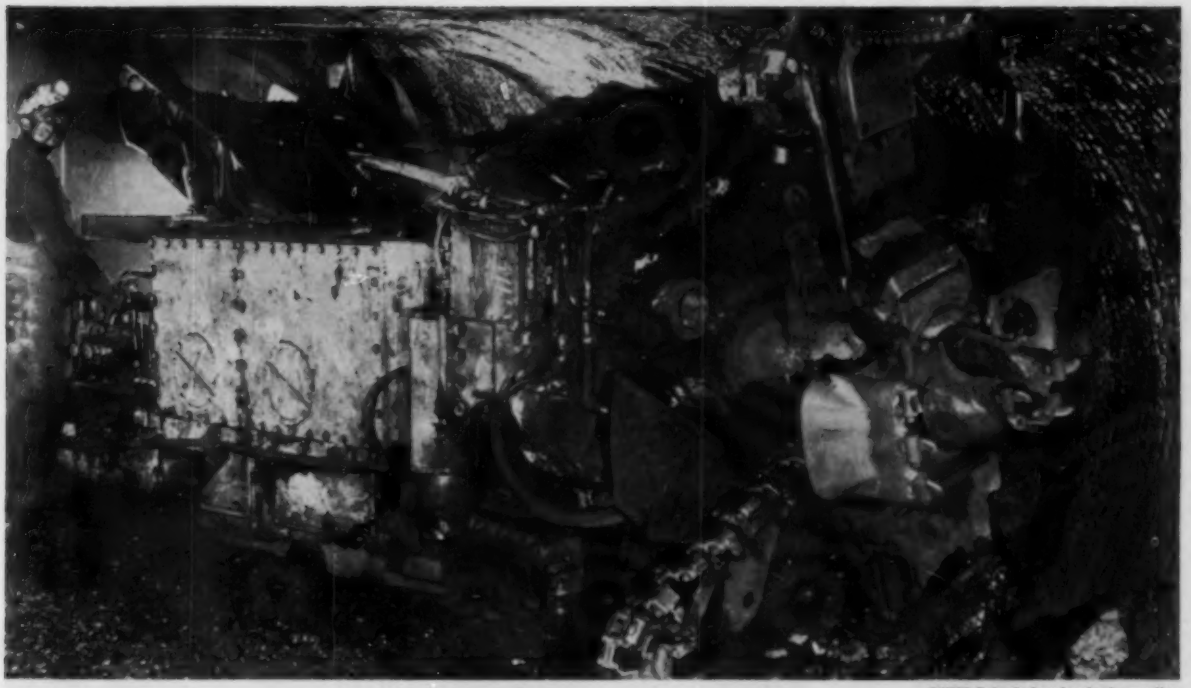
Principal contracts, one to Combustion Engineering, Inc., ($10,960,000 for the boiler) and one to General Electric Co., ($16,112,000 for turbo-generator) were let by TVA recently, for a 500,000 kw steam generating plant, tentatively to be located at the Widow's Creek plant near Stevenson, Ala. The new installation, it is reported, will consume approximately 1.5 million tons of coal annually. About 1,250,000 tons will be net gain, the difference being due to plans to reduce operations of some of the older units.

Battle Rages Over AEC Contract

Feeling is running high over proposed transfers of substantial tonnages of coal from a contract to supply 476,000 tons of coal to an atomic energy plant at Hanford, Wash. The facts are, briefly, these. A combination of firms in Wyoming, Montana, Utah and Washington had been supplying the coal for Hanford. Then the entire contract was awarded by the Atomic Energy Commission to Kemmerer Coal Co. in Wyoming; the contract called for 476,000 tons, and was evidently hard won by Kemmerer, which had reduced its prices several times in the last few years to meet competitive offers.

Congressional delegations of the three other states brought pressure to bear on the AEC, which considered opening bids once again. Senator Barret of Wyoming complained that he was "amazed that the Kemmerer Coal Co. is being asked to give up 200,000 tons of its hard-won tonnage." Other opponents of the move suggested that it had the earmarks of a political economic move by Northern Pacific R. R. Co., backed by Senators James E. Murray and Mike Mansfield of Montana. Further investigation revealed that more coal miners are out of work in southwestern Wyoming than the total number employed in Montana during the peak of coal production.

Despite such bitter attacks, General Electric Co., contractor for the AEC, reopened bids due to a decision by the commission that only 365,000 tons of coal would be needed for 1958. Bids were received Oct. 2 for quantity instead of price, it being specified that the award would be made on an equitable basis. In an attempt to appease protests and demands that some allocation be made to the Roslyn-Cle-Elum mines in Washington and the Roundup mines in Montana, the AEC recommended the following distribution. Northern Pacific Ry. Coal Dept., at Roslyn and Cle-Elum, Wash., 48,000 tons. Continental Coal Co., Spokane, Wash., mine at Hiawatha, Utah, 48,000 tons. Mountain States Mining Co., Roundup, Mont., 25,000 tons. Roundup Coal Mining Co., Roundup, Mont., 29,000 tons. These figures are in the form of a counter-proposal to the four companies, which offered greater quantities on bids; no contract was signed. Meanwhile, Kemmerer has agreed to cut their tonnage to 284,000 tons under the contract.



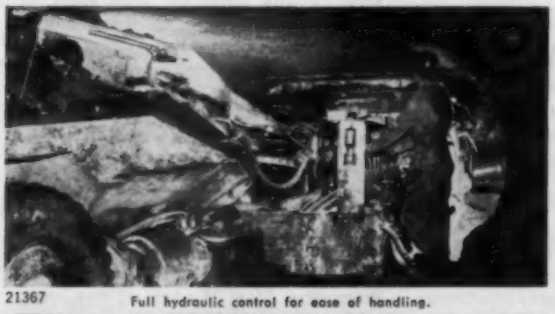
21565 Patented and patents pending

2403.4 tons in one day
with GOODMAN CONTINUOUS BORER

1159.8 TONS ON DAY SHIFT—1243.6 ON NIGHT SHIFT

With an 8 man crew, including roof bolters, mechanic and foreman, the average tons per man shift was 143.7 (day) and 155.3 (night).

These production figures were obtained just recently on retreat work in a midwestern operation. Mining height is 7 feet. Shuttle cars are used to take coal produced by borer to outby transportation system.



21367 Full hydraulic control for ease of handling.

21368 Path cut has narrow span of flat roof and arched sides. Bottom is wide.

This is the type of production that boosts profits, particularly when there are other borer advantages:

- **Easy maneuverability for fast development work as well as pillar recovery. Safe tramming clearances through retraction of cutting elements.**
- **Good size consist as coal is cut with bits contacting only small area of face.**
- **Concentrated working areas that require fewer man hours, less supervision.**
- **Safety by elimination of hazards associated with blasting, arched path for natural roof support, rapid advance to reduce possibility of roof deterioration.**
- **Low maintenance because of clean, simple design featuring large parts and a minimum of moving parts.**

Add up these advantages. Coupled with high productive capacity they are reasons why an investment in a Goodman Continuous Borer can be written off in a short time in terms of high tonnages at lower cost per ton.

GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

Coal Show Plans Progress Smoothly

Plans are unfolding smoothly for Bluefield's biennial coal show. Albert S. Kemper, Jr., president of Premier Pocahontas Co., Bluefield, W. Va., and general chairman of the Southern Appalachian Industrial Exhibit, announced that many of the 250 exhibitors participating in the 1956 show had already been contacted regarding space for this year's affair. Along with the enthusiasm of exhibitors from previous years go requests for information from potential new exhibitors. The Bluefield show, known throughout mining circles, alternates with the mammoth American Mining Congress exhibit in Cleveland. The show has grown from a modest beginning in 1934 with 35 exhibitors and an attendance of 15,000, to become one of the largest industrial exhibits, drawing attendances of 60,000 or more. Held at the Norfolk and Western Ry. Co.'s spacious Bluefield freight station, this year's display will run from May 21 through May 23.

ASHES ARE REMOVED automatically from this new anthracite boiler at Suydam Corp., property and loaded into barrels by a conveyor. Maintenance man switches barrels once a day during cold weather.

Simple Arithmetic, More Economy

On the basis of an experiment and some careful computation, president A. Hicks Lawrence of Suydam Holding Corp., of New York, came up with some revealing figures on economy in use of coal for heating, as compared to fuel oil. The facts on installation and use of automatic anthracite-burning equipment to heat Suydam firm property were made known by Glen Alden Corp. Although other operators were converting to fuel oil heat, the president set up the heating facilities in the basement of a three-story building containing some 20,000 sq ft, housing two knitting companies and a dress manufacturer. Blue Coal Corp. advised in preparations and called in Stoker Sales & Service Corp., of Jamaica, N. Y. The equipment and installations cost Suydam Realty $2,255.58 complete. According to an estimate secured by Mr. Lawrence, an oil-burning unit capable of yielding the same amount of heat would have cost between $4,500 and $5,000. The boiler burns up to 60 tons of coal each winter; an oil installation would require about 10,200 gal of fuel during the same period. Suydam Realty paid approximately $16.60 per ton for buckwheat Blue Coal last year, it is reported; oil would have cost 14.7 cents per gallon, according to the company's estimate. Thus at 1956 prices for both fuels, a season's heating with anthracite costs approximately $996 against $1,499.40 for oil. The small amount of electricity used by the stoker is the only other expense connected with the plant's operation, it is said. Mr. Lawrence feels that coal installation provides better, more even heat than an oil burner would. He said the building's tenants were quite pleased with the service they received last winter. Naturally the Suydam firm was happy, and why not! It's simple arithmetic.

Production Predictions

The Committee on Coal Economics and Statistics of NCA has for forecast in its quarterly review, production of 500,700,000 tons of bituminous coal during 1957. This compares with actual production of 500 million tons during 1956. The committee also predicted a gradual rise in production to about 502 million tons for twelve months ending Sept. 30, 1958. This forecast and official 1956 production figures, in millions of tons, is illustrated below.

	Estimated 1957 Production	*1956 Production*
Electric Utilities	162.0	155.0
Coking Coal	107.0	105.8
Steel & Rolling Mills	5.2	5.1
Cement Mills	9.0	9.2
Ry. Fuel	8.5	12.3
Other Industrials	90.0	95.7
Retail Dealers	39.0	49.1
Total U. S.	420.7	432.2
Canada	21.0	20.6
Overseas Exports	57.0	47.9
Stocks, etc.	2.0	–0.7
Production	500.7	500.0

News Briefs

Appalachian Electric Power Co. has announced acquisition of about 1,450 acres of land along the Ohio River at Apple Grove, W. Va., for the site of a future steam-electric generating plant and further industrial development in the Ohio valley.

G. L. Furr, vice president and general manager of Appalachian, said that the company was looking ahead to further location of chemical and other heavy industry in the already highly-industrialized Ohio River Valley.

Union officials reported recently that Progressive Mine Workers at two companies in a southwest Illinois county voted to reaffiliate with United Mine Workers.

There is some feeling that the moves, which occurred at Peabody Coal Co.'s St. Ellen mine and Midwest Radiant Fuel Co. at Millstadt, sounded the death knell of PMW in St. Clair County, long a Progressive stronghold. It may also mark the end of a 25-year feud between the two unions, that in the 1930s resulted in violent death for more than 30 miners. Ray Dupee, president of PMW,

132 PIECES TO LUBRICATE...

11 Cities Service Lubricants do job!

Located at the eastern end of the great Mesabi Range, the beneficiation plant of the W. S. Moore Company is made up of 132 individual pieces of equipment.

In itself, that makes a formidable lubrication job . . . but added to that is the fact that much of this equipment must constantly be exposed to the weather.

Corrosion, oxidation and rust could reap costly damage . . . but instead they're licked!

How? Through the use of a detailed lubrication survey and frequency application chart prepared with the assistance and cooperation of Cities Service Lubrication Engineer James Levine!

Result: all 132 pieces of Moore's equipment are lubricated by eleven Cities Service Lubricants . . . and there's never been a lubrication failure!

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EQUIPMENT	LUBRICANT
Gear reduction sets	Pacemaker #3 and #5
Screen and feeders' gear boxes	Trojan L-2 and L-4 compounds
Electric motors, conveyor bearings	Trojan H-1 and H-2 grease
Compressors	DC 915 compressor oil
Jaw and gyratory crushers	Trojan MP 90 and 140 gear oil
Open gears	Cisco 3Z
Jaw crusher	Trojan F-3-0

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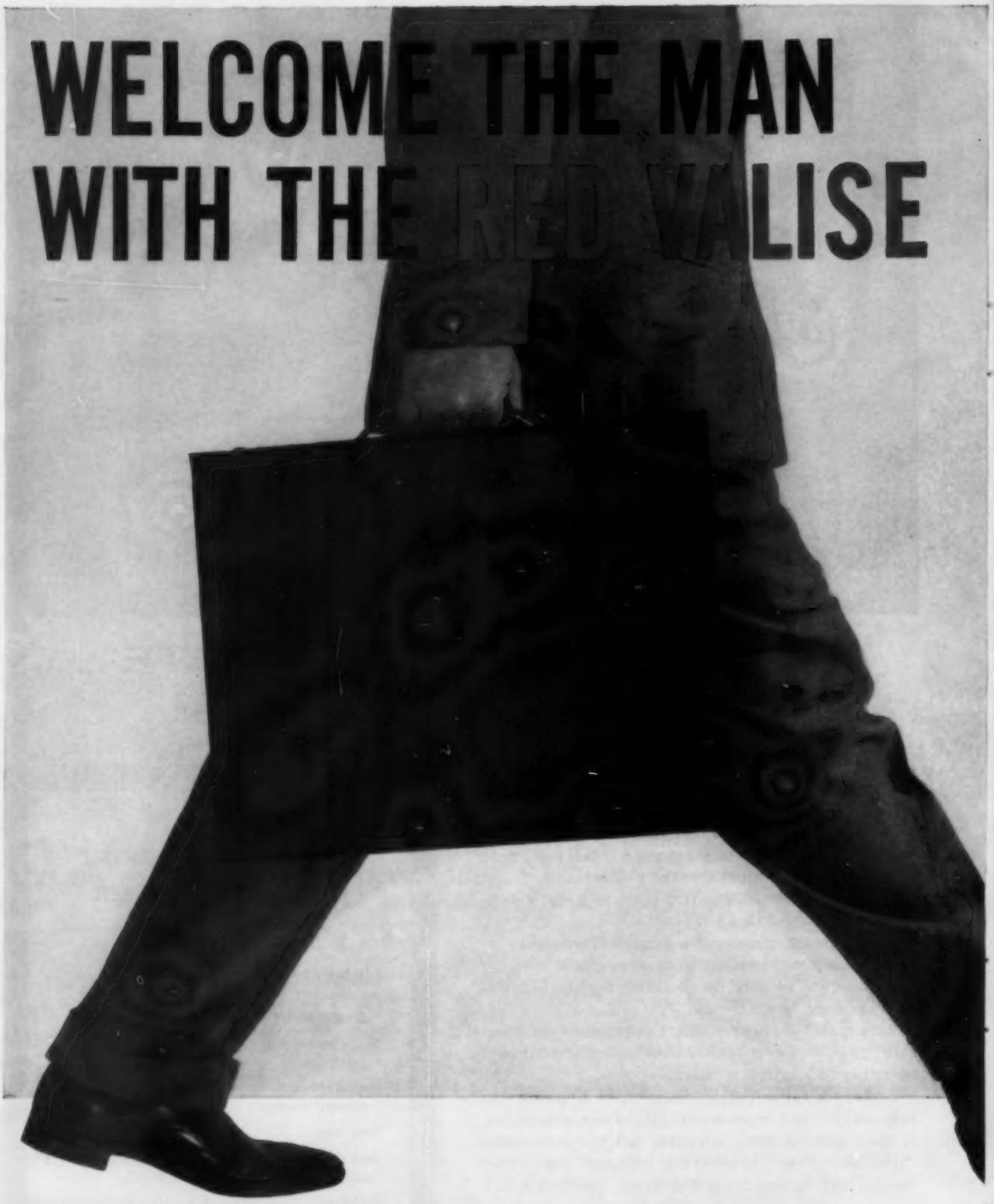

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He can show you why Hercules sets the pace in Blasting Caps

Whatever you need in a blasting cap, Hercules has it—And the Hercules representative can show you an actual dummy sample from this "full line" kit. The Man with the Red Valise will be calling on you soon—if he hasn't already—and when he does you'll learn why Hercules is a recognized leader in blasting cap development.

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Electric Blasting Caps—Manufactured in two strengths with plastic-coated copper leg wires available in lengths from 4 to 250 feet.

Waterproof Electric Blasting Caps—Designed to withstand high water pressure.

No Vent® Delay Caps—One-piece, all-metal shell. No Vent helps prevent misfire in wet work. Available in delay periods from "0" to "15". An exclusive Hercules development.

No Vent® Short-Period Delay—Similar in construction to No Vent cap but in 27 delay periods from 25 milliseconds to 2950 milliseconds.

Electric Squibs—Special firing devices for use with black blasting or pellet powder where electricity is employed.

Special Packings—All-electric blasting caps may be obtained packed on cardboard spools for easier handling. Primatube®, a rigid cardboard tube available for some types of caps, makes a primer when the tube is fitted over a dynamite cartridge.

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Dependable Fire—Special alloy is used as the bridge wire in the firing element of Hercules Electric Blasting Caps. Wire is noncorrosive.

Engineered Shell—Bronze shell of a Hercules cap goes through fifteen separate operations while it is being expertly shaped.

Tough, High Dielectric Insulation—Leg wires of Hercules caps are coated with plastic insulation for outstanding toughness, resistance to abrasion, superior dielectric qualities.

Double-Packed Wallop—Bridge wire extends into the priming charge and makes positive contact to give rapid ignition.

Securely Anchored—A cast sulfur plug in the upper part of shell anchors entire firing mechanism in place.

Watertight Waterproofing—A special Hercules waterproofing formulation minimizes the possibility of moisture or dampness penetration.

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Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Calif.

XR57-6

denied any reports that his union was disintegrating, it was announced. He acknowledged the moves of the two companies, but stated that "our union has no intention of going out of business . . . our big problem," Dupee said, "is the same one that the UMW has. That's the shutting down of coal mines all over our territory."

Four employees of the Kemmerer Coal Co. went to see the University of Wyoming Cowboys play Kansas State in the first game of the season through the generosity of the company.

John Beachler, Jr., William Harris, Ed Hysell and William Williams won a drawing held by the firm for the "Quarterback Train," a function designed to build spirit among the employees.

Approximately 500 men were idled by the closing of Huber mines, Ashley, Pa., announced recently by Glen Alden Corp.

The men removed all tools and clothing. The closing of the mine did not affect the breaker which continued to operate, handling coal from other mines and a number of stripping operations. The shutdown was blamed on a surplus of coal, making it unprofitable to operate the mine any longer.

There is much uncertainty with respect to the level of tolls to be applied to shipping once the St. Lawrence Seaway is opened to through traffic, it is reported.

(*Continued on p 134*)

R. DAWSON HALL

J. H. (JACK) EDWARDS

Retiree Report

R. Dawson Hall and J. H. Edwards, *Coal Age's* two retired editorial members, report that they are leading active and enjoyable lives.

Mr. Hall, who retired in 1946 at the age of 76, still maintains his home at 340 Burns St., Forest Hills, L. I. He travels extensively to coal meetings and for pleasure and instruction, and continues his activities in the journalistic side of coal mining with contributions to encyclopedias and other publications. Mr. Hall joined the old Hill Publishing Co. in 1911 to help start *Coal Age*. At the time of his retirement he was engineering editor of this publication.

Jack Edwards retired at the age of 65 in 1955 with the title of associate editor. He joined *Coal Age* on a "temporary" basis in 1924, and was the publication's specialist in the power, mechanical and maintenance fields. In 1956 he moved from his base of many years in Huntington, W. Va., to Tucson, Ariz. (Solana Y Sombra, 48-28 E. Grant Rd.), and is now engaged in completing his trailer explorations of the West, including Canada and Mexico—a project he embarked on many years ago in his spare time.

Preparation Facilities

Swatara Coal Co., Minersville, Pa.—Wemco Fagergren cells, hydroseparator, pumps, conditioners to treat 35 tph anthracite fines (ROM and bank); 35x200m. Addition to present preparation plant. Operation from Oct. 1.

Diamond Coal Co., Mt. Carmel, Pa.—Wemco Fagergren cells, hydroseparator, pumps, conditioner, to treat 50 tph anthracite fines (ROM and bank); 35x200m. Addition to present preparation plant. Operation from Oct. 1.

Russell Fork Coal Co., Mikegrady Mine, Elkhorn City, Pike Co., Ky.—Contract closed with the Deister Concentrator Co., Inc., for 4 No. 7 superduty diagonal deck washing tables and for one Concenco revolving feed distributor.

Imperial Colliery Co., Imperial Mine No. 8, Burnwell, W. Va.—Contract closed with Daniels Co., Contractors, Inc., Indiana, Pa., for a complete new preparation plant including a DMS dense-media washery to wash 5x⅜-in ROM coal. Overall capacity, 250 tph. Completion expected in early 1958.

Kocher Coal Co., Valley View, Pa.—Wemco 2 compartment drum for 150 tph feed anthracite, 2⅞ in, 150 tph; replacing of other types of cleaning equipment. In operation August 1957.

Pine Ridge Mining Co., Ashland, Pa.—Wemco 2 compartment drum Mobil Mill; treat 150 tph. Anthracite ROM and bank, 2⅞x¾ in; replacing older types of cleaning equipment.

Columbia Geneva Steel Div., U. S. Steel Corp., Wellington, Utah.—Contract closed with Diester Concentrator Co., Inc., for No. 7 diagonal deck washing tables and for Concenco revolving feed distributors, to be used in new preparation plant.

Slab Fork Coal Co., Gaston Mine, Alpoca, W. Va.—Contract closed with Daniels Co., Contractors, Inc., Ind., Pa. for DMS dense-media washer to produce additional 4x⅜-in coal at rate of approximately 75 tph.

J. E. B. Pocahontas Coal Co., Bramwell, W. Va.—Contract closed with Fuel Process Co. for 50-in duplex-angle type Belknap calcium chloride washer, with automatic specific gravity controls and accessories.

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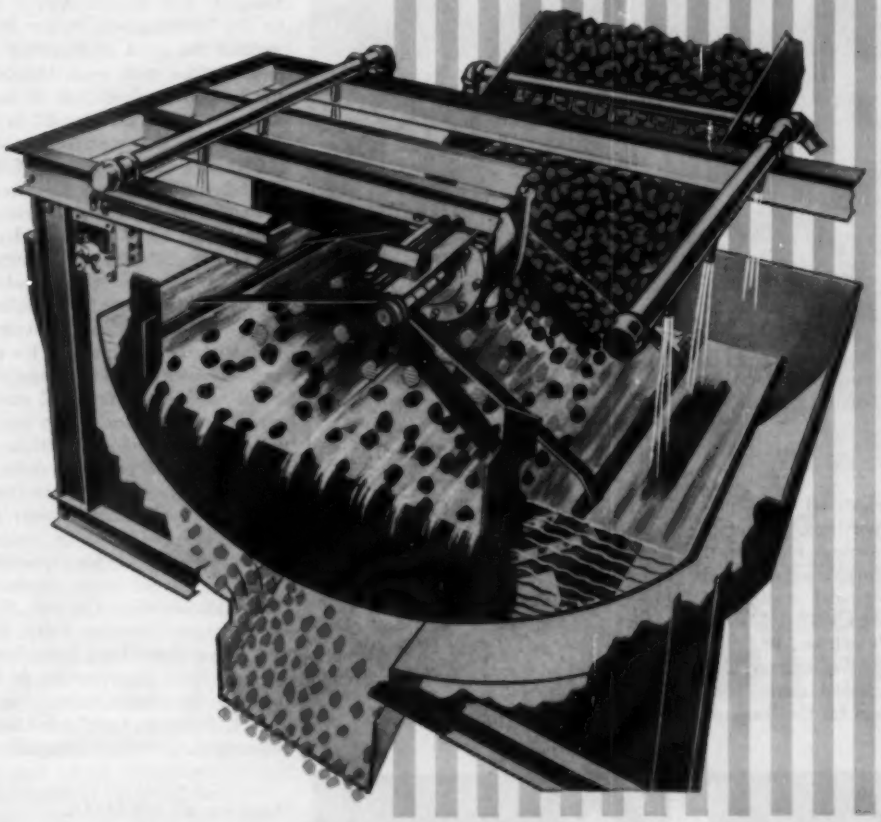

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SPEAKERS include R. A. Huth (left), Universal Welding and Metals Inc., who made Man of the Year Award; Harry Young, Cooke-Wilson, session chairman; Monroe Mechling, Valley Camp Coal Co., ME-MMA president; D. C. Jones, Penn State; W. G. Kegel, Jones & Laughlin Steel Corp.; and F. W. Myers, Penn State.

Electro-Mechanical Group Meets

Expected maintenance topic at 5th annual meeting held at Uniontown, Pa. Award winners announced at banquet.

A RECORD 411 electrical and mechanical experts, supervisors, manufacturers' representatives and others met Sept. 28 for a technical session and banquet at the 5th annual meeting of the Mining Electro-Mechanical Maintenance Association, Uniontown, Pa.

Harry Young, Cooke-Wilson, presided at the afternoon technical session and also served as chairman for the banquet. Monroe Mechling, Valley Camp Coal Co., and ME-MMA president welcomed the members on behalf of the association. Speakers at the meeting were D. C. Jones, director of Mineral Industries Extension Service, Pennsylvania State University, University Park Pa.; W. G. Kegel, assistant general master mechanic, Vesta Shannopin Coal Div., Jones & Laughlin Steel Corp., California, Pa.; F. W. Myers, assistant professor, College of Mineral Industries, Pennsylvania State University Park, Pa.; and H. L. Washburn, preparation manager, Consolidation Coal Co. (W. Va.), Fairmont, W. Va.

Mr. Jones offered an appraisal of ME-MMA in 1957 as "A Case of Self Analysis"; Mr. Kegel described "Expected Maintenance of Mining Machinery"; Mr. Myers read a paper on "Expected Maintenance of Belt Conveyors"; and Mr. Washburn spoke on "The Responsibilities of a Maintenance Man."

Winners of the ME-MMA Branch Award and the Maintenance Man of the Year Award were announced at the banquet. The Branch Award was won by the Monongahela Valley Branch for making the most outstanding advancement in the past year. Membership in this branch climbed from 68 to 113 and average attendance was 57 at meetings throughout the year.

The Maintenance Man of the Year Award was won by J. C. Sweeney, assistant shop foreman, Warwick mine, Duquesne Light Co. Selected earlier as the choice of the Greene County Branch, Mr. Sweeney won the award in competition with entrants from four other branches. His contribution to better maintenance was to conduct a classroom and laboratory training program in electrical trouble shooting and maintenance on mining equipment. The result of the program was the elimination of many costly hours of electrical delay because 57 maintenance men were trained to quickly appraise and correct electrical trouble.

Runnersup in the Maintenance Man of the Year Award were Charles Rogers, Consolidation Coal Co. (W. Va.), Fairmont branch; Theodore Falbo, Pittsburgh Coal Co., Greensburg-Irwin branch; M. J. Campbell, Eastern Gas & Fuel Associates, Johnstown branch; and W. G. Kegel, Jones & Laughlin Steel Corp., Monongahela Valley branch.

MAINTENANCE MAN OF THE YEAR —J. C. Sweeney, assistant shop foreman, Warwick mine, Duquesne Light Co.

BRANCH AWARD—Monongahela Valley, is presented to W. E. Cooke, U. S. Steel, by Charles Black, Westinghouse.

Looking at ME-MMA

In giving an appraisal of ME-MMA in 1957, Mr. Jones said that it is the only organization providing an institutional-type of educational service for mine maintenance men on a widespread scale. The group has declared its intention to continue spreading that service to any mining area in this country. In view of this, Mr. Jones asked if ME-MMA is giving the proper kind of service now and if the group has the ability and vision to serve maintenance men on a national scale.

When it comes to spreading ME-MMA influence to other distant mining areas, Mr. Jones said that he finds a distressing situation. Few of the men prominent in the distant associate councils have grown up in the tradition of the Central

ME-MMA *(Continued)*

Advisory Council. As a result, there is a hazard that those groups will fail to maintain ME-MMA objectives or will fail to serve adequately the area in which they are centered.

At present the organization does not have the proper control for the association's activities in many areas. To advise and control the activities of several associate councils, Mr. Jones suggested that an ME-MMA National Advisory Council be set up. In conclusion, Mr. Jones said the organization should not delay in assessing progress to date and then develop long range plans for the future.

Mining Machinery

Mining machinery is much different today than it was 25 yr ago, Mr. Kegel declared, in opening his discussion of expected maintenance of mining machines. Equipment was simpler, there was less of it and maintenance men did not have the many types of tools available today.

A continuous miner probably receives more abuse than any other machine, Mr. Kegel observed. And conditions under which maintenance in the mine must be done usually are difficult.

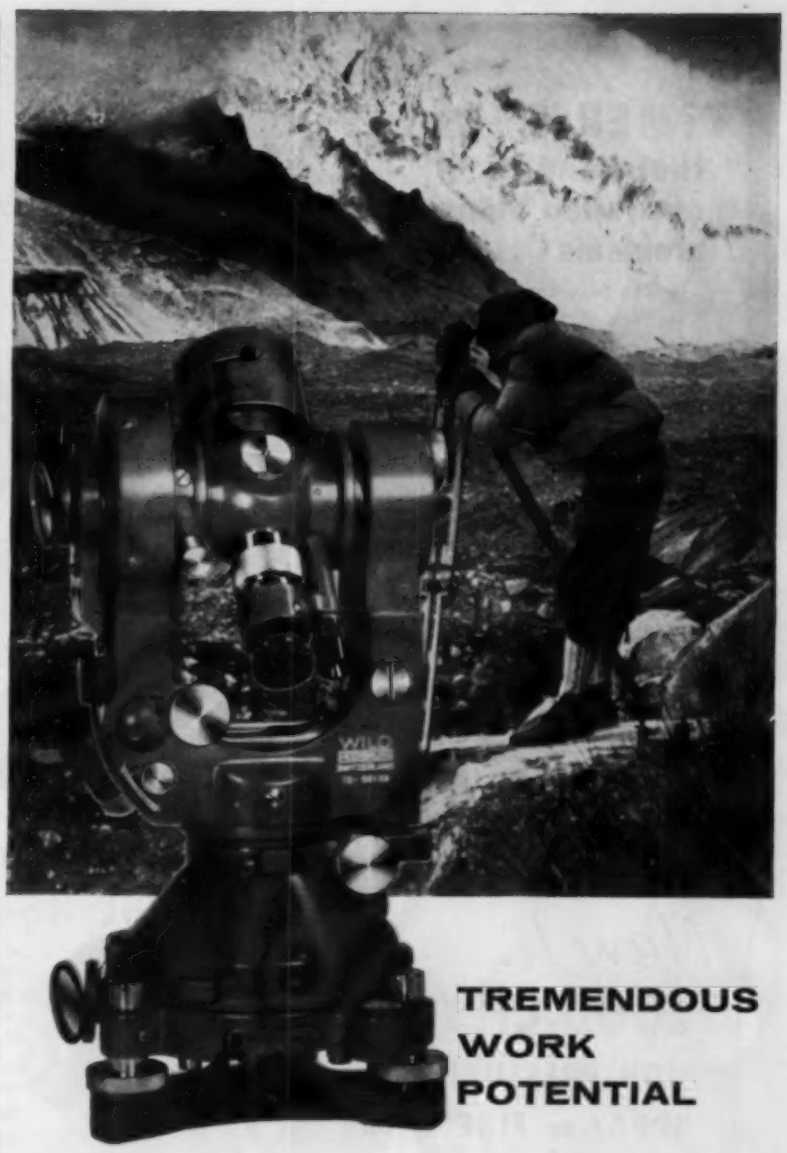
Proper lubrication requires careful attention, Mr. Kegel added. Oil-seal leaks can be expected periodically and new seals should be installed as quickly as possible. Bearings get out of adjustment and must be given attention to prevent serious trouble. The flexible discharge on a continuous miner, which has not received as much care as it should, needs planned attention.

Universal joints on shuttle cars work efficiently only if they are operated within design limits, Mr. Kegel warned. If operated at too great an angle, trouble can be expected. Other points where maintenance can be expected on shuttle cars include power steering, chains and sprocket, and wheel alignment.

On the subject of electrical equipment, Mr. Kegel said that from the design viewpoint, most motors are suitable. Timing relays on multiple-step starters for large motors should be checked regularly to avoid trouble. The mercury tube and interlock relays are the outstanding developments in mining electrical controls.

The hydraulic system is becoming the brain of modern machines. The reason for this is that electrical circuits can be simplified. Dirty or contaminated oil is the big enemy in a hydraulic system, Mr. Kegel said. To reduce heat in the hydraulic circuit, dirt must be kept off all hydraulic hoses. Tampering with a relief valve should be avoided and maintenance men should make regular checks to see that it is set properly.

Looking into the future, Mr. Kegel said that multiple-unit control of con-



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that handles all controlled timing problems . . .

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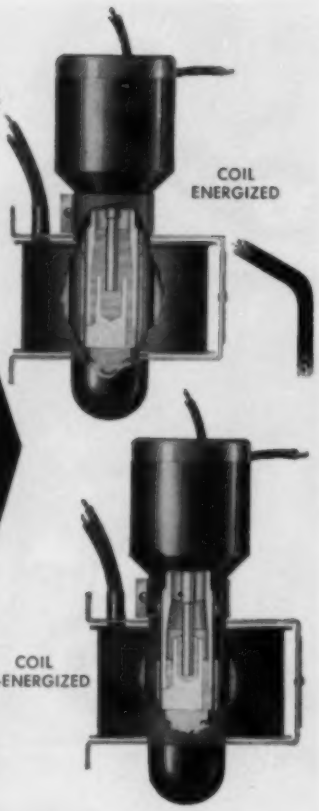

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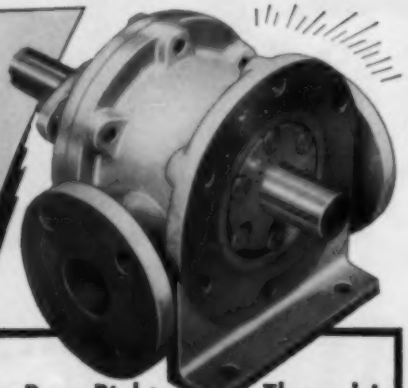

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● Here is no ordinary pump! Here is a pump designed to do a pumping job under the most adverse conditions. This rotating vane, positive displacement pump employs round stainless steel rollers instead of the usual flat type vane. A feature which allows for free, full flow pumping of dirt or coal particles which would jam or damage the conventional type pump. This pump reduces cavitation and performs efficiently at standard motor speeds. Friction and power consumption are reduced by the roller action of the vane . . . an action similar to that of a roller bearing.

● Built in various capacities the 10 GPM size at 100 to 125 pounds pressure is suited for spraying. At 50 pounds pressure the 50 GPM size takes care of fire pump needs. In refilling the tank merely place the hose in the water supply and reverse the motor. This new high pressure pump is made of "Flood City" acid resisting bronze with a stainless steel shaft. Other materials available upon request.

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ME-MMA *(Continued)*

tinuous miners is a definite possibility. Electronic equipment will be needed for this type of installation. Increased use of torque converters is another future possibility.

Belt Conveyors

Continual and trouble-free operation is necessary with belt conveyors. A good preventive maintenance program for belts starts at the time of installation, Mr. Myers said. The belt should be aligned properly when it is set up. Periodic inspection of bolts and studs on motor and speed reducer will prevent failure of the drive unit once it is installed.

For long life, a lubrication schedule is necessary for moving parts. Belt cleaners must be checked regularly to make sure no dirt gets by to cause belt wear. Intermediate sections must be inspected periodically by trained men, kept in alignment and level across the conveyor to keep the return side of the belt from rubbing.

Belt rollers need attention and always are a problem, Mr. Myers declared. Periodic inspection is the best way to prevent roller trouble. Spillage must be eliminated or kept to a minimum and maintenance men must work with operating men to eliminate the causes.

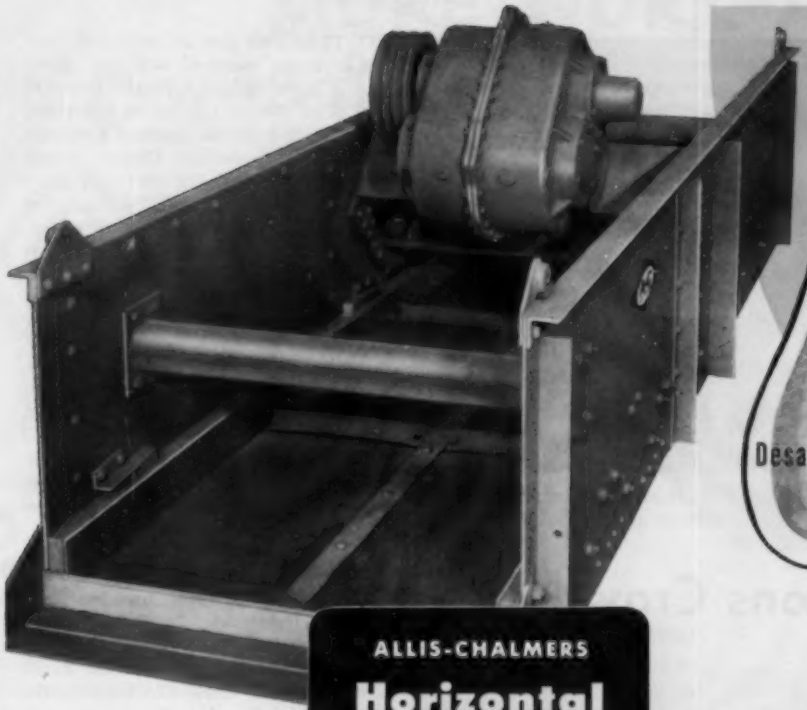
Proper maintenance of the tail section gives long belt life. The end section must be properly secured and then maintained for the life of the setup. Belt tension, splices and belt carcass should be checked at regular intervals to prevent failures that may offset savings achieved by using belts.

Maintenance Men

The man who runs the maintenance department is the most important man at the mine, Mr. Washburn said in keynoting his talk on maintenance men. Without a good maintenance supervisor, good equipment and good mechanics do not mean much. A good maintenance man must have initiative, drive and the ability to direct others.

A good set of records is needed by a maintenance supervisor. He needs them to predict when a unit will fail. Such a record can be set up from past experience with the various machines. Repairing or replacing a unit before it fails is the maintenance supervisor's job. And it can be done with the aid of good records. A failure is a reflection on the maintenance man and he should remember this fact.

In conclusion, Mr. Washburn said that maintenance is a way of life. The maintenance man must think about it at all times on the job, at home and over weekends.



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IN any preparation plant you're almost sure to see Allis-Chalmers screens on *all* the tough dewatering jobs. Why this marked preference? The most important reason is that the coal industry itself has had a constant influence on the development of this outstanding performer. *Throughout the past quarter century,* the cooperation of plant operators has enabled Allis-Chalmers to design and build the sturdy, efficient screen needed for dewatering operations.

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Close contact with the coal industry has also given Allis-Chalmers a vast volume of application information. This invaluable data on capacities, surface moistures and other variables is available to tipple manufacturers and operators—for determining flow sheets and the selection of heat driers, centrifuges, etc.

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Allis-Chalmers vibrating screens are widely used to close circuit a plant in conjunction with cyclones and/or thickeners for recovery of solids, fine coal and refuse, and to prevent stream pollution.

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MORE WORK-ABILITY

TOPS IN FIRST AID—Island Creek Coal Co.'s team from Wyoming mine, Holden, W. Va. receives NCA trophy, Congressional medallions and *Coal Age* silver cup.

Safety Champions Crowned

TOPS IN MINE RESCUE—U. S. Steel team from Lynch Dist., Lynch, Ky. receives the UMWA trophy, Congressional medallions and *Coal Age* silver cup.

COMBINATION WINNER in first aid and mine rescue, from U. S. Steel's Frick Dist., Uniontown, Pa., won Mine Safety Appliances Co. trophy.

FORTY-SEVEN first aid and eight mine rescue teams matched skill and speed in the 17th biennial National First-Aid and Mine Rescue Contest at Louisville, Ky., Oct. 2-4. In the spacious Kentucky Fair and Exposition Center, Island Creek Coal Co.'s first-aid team from Wyoming mine, Holden, W. Va. won a clore victory over 46 other teams. Members of the champion first aid team are Willard Graham, captain, William McClure, Herbert Clay, Gabor Gombos, William Dalton, James Hylton and W. L. Ogle.

In the mine rescue contest, the team from U. S. Steel Corp.'s Lynch District, Lynch, Ky. won top honors over seven other teams. It was captained by Ted Hollin. Other team members were William Hollin, Lee Marsili, Frank Sizemore, Doyle Cunningham, Charles Steele, and Robert Wilkinson.

In the combination first aid and mine rescue contest, first place was won by U. S. Steel Corp.'s team from the Frick District, Uniontown, Pa. Pete Yadamec was captain of the winning team. Other members were Walt Vincinelli, Frank Shoaf, Marvin Gates, Charles Schessler and Richard Murphy.

The Island Creek first aid team was awarded a silver cup trophy from *Coal Age*, an inscribed safety lamp from *Engineering & Mining Journal*, Congressional medallions and the NCA trophy.

The first-place mine rescue team from U. S. Steel's Lynch district was awarded a silver cup trophy from *Coal Age*, an *E&MJ* lamp, Congressional medallions and a trophy from UMWA.

The combination team from U. S. Steel Corp.'s Frick District was awarded Congressional medallions from the USBM and a trophy from Mine Safety Appliances Co.

Second place in first aid was won by the Robena No. 2 team, Frick District, U. S. Steel Corp., Uniontown, Pa. Captained by John Chambers, it was awarded a Mine Safety Appliances Co. trophy.

Third place honors were captured by the Georgetown No. 12 team, Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Corp., Cadiz, Ohio. It was captained by Bob Secrest and awarded a trophy from the UMWA.

Second-place honors in mine rescue went to Bethlehem Mines Corp.'s team from mine 22, Deane, Ky., captained by Wilmar Donahue. It was awarded a trophy from the National Coal Association.

Third place in mine rescue went to the Price No. 1 team, Inland Steel Corp., Wheelwright, Ky. Winner of a Mine Safety Appliances Co. trophy, the team was captained by J. P. Gibson.

Second place in the combination-team contest was won by the No. 2 team from Island Creek Coal Co., Holden, W. Va. It was captained by James E.

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With overhung engine type tractors and full 90° hydraulic steering, these two new Euclid Rear-Dumps have excellent maneuverability for close quarter work and accurate spotting at loading and dumping areas. Big tires provide extra traction and flotation for soft fills and difficult hauls. The low over-all loading heights and rugged construction permit easy loading with all types of equipment. Smooth bodies with 3-stage, double-acting Euclid hoists assure quick shedding of loads.

Downtime and maintenance costs are held to a minimum as a result of the easy service accessibility of all major components. Interchangeability of the semi-trailer rear dump bodies with 7 and 18 yard scraper bowls provides extra flexibility for changing job requirements.

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REAR-DUMP

12 tons payload ...
11 cu. yds. heaped ...
143 h.p. ....
18.00x25 tires ... top speed loaded of 26.5 mph ...
Torqmatic Drive ...
NoSpin differential.

AND THE

S-18

REAR-DUMP

35 tons payload ...
32 cu. yds heaped ...
300 h.p. ... 27.00 x 33 tires
Torqmatic Drive ...

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

VICTAULIC®

METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 12".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS
Elbows, Tees, Reducers, Laterals, *a complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".

VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. A-11

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

Champions *(Continued)*

COAL AGE TROPHIES

Robertson and presented with a trophy from the UMWA.

H. R. Burdelsky, SUBM, served as chief judge of the first-aid contest and George W. Colbert, USBM, was chief judge of the mine rescue contest. Winners were announced and awards presented at a banquet at the Sheraton-Seelbach Hotel, Louisville, Oct 4. Harry Gandy, Jr., director, Department of Safety, National Coal Association, Washington, D. C. was toastmaster at the awards banquet.

The contest was held under the auspices of the USBM and the Joseph A. Holmes Safety Association, in cooperation with the National Coal Association, UMWA and State Department of Mines.

Marling J. Ankeny, Director, USBM, Washington, D. C. was general chairman of the contest and was assisted by L. W. Schuler, assistant to safety director, UMWA, Washington, D. C.; H. F. Weaver, chief, Div. of Coal Mine Inspection, USBM, was secretary; Robert Norcross, West Virginia Coal Association, was treasurer; and A. D. Sisk, USBM, was announcer.

TIGERWELD BONDS

Easy to install, but made to last

A TIGERWELD WEDGE-TYPE BOND installs easily, without need for precision drilling or welding.

It's designed primarily for quick installation, and goes on in three easy steps—*First*, simply drill a hole with an ordinary track drill. *Second*, insert the terminal and wedge. *Third*, drive the wedge in with three quick blows. The bond is easily removed . . . just hammer it out.

A Tigerweld Wedge-Type Bond is the right selection for temporary trackage. Yet, many mines now use it for permanent trackage, too, because of its sturdiness and durability.

For other jobs, you will find other TIGERWELD BONDS perfectly suited to your needs. Consult the nearest American Steel & Wire Sales Office for bonds . . . for service . . . for advice on any bonding problem.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

UNITED STATES STEEL

CHATEAU FRONTENAC, Quebec City—chosen as headquarters for the 20th Annual Joint Solid Fuels Conference.

Joint Fuels Group Meets in Canada

Two hundred fifteen U. S. and Dominion coal men gather to hear talks on mining, preparation and marketing subjects. Conference theme: Coal-Energy Reservoir of North America.

PERCY NICHOLLS AWARD—presented to John Blizard (above), Foster-Wheeler Corp. Carroll Hardy, Bituminous Coal Institute, made the presentation.

INDUSTRY MEETING—
A Special COAL AGE Staff-Written Report

A PANORAMIC VIEW of coal's past, present and future position in the Canadian economy highlighted the 20th Annual Joint Solid Fuels Conference held at the Chateau Frontenac, Quebec City, Oct. 10-11. Also featured in the Thursday and Friday sessions were informative talks on the production, preparation and marketing of coal.

The meeting—first in conference history on Canadian soil—was held under the joint auspices of the American Society of Mechanical Engineers, the Canadian Institute of Mining and Metallurgy, and the American Institute of Mining, Metallurgical and Petroleum Engineers.

T. S. Spicer, ASME, head, Dept. of Fuels Technology, Pennsylvania State University, acted as the conference's general chairman. Co-chairmen were: Dr. H. B. Charmbury, AIME, head, Dept. of Mineral Preparation, Pennsylvania State University; and Dr. A. O. Dufresne, CIM, deputy minister, Department of Mines, Province of Quebec.

Guest speakers at Thursday's luncheon and banquet were, respectively, C. Ouellet, dean of the faculty of science, Laval University, Quebec City, and Dr. Jean Bruchesi, under-secretary, Province of Quebec.

At the banquet, Carroll Hardy, Bituminous Coal Institute, presented the Percy Nicholls Award to John Blizard, research director, Foster-Wheeler Corp., N. Y. Mr. Blizard was cited for his many contributions to advanced practice in fuel utilization and heat transfer, and for the research he has directed on radiant superheaters, pulverizer design, twin-furnace and forced circulation steam generators, and heat exchangers for oil refining.

The first session, Thursday morning—under co-chairmen C. Gerow, secretary-treasurer, Canadian Institute of Mining and Metallurgy, and A. Ignatieff, chief, Div. of Fuels, (Canadian) Dept. of Mines and Technical Surveys—included the following papers:

Coal, A Source of Canadian Energy, C. L. O'Brian, assistant to the chairman, Dominion Coal Board.

The Influence of the St. Lawrence Seaway on Marketing of Coal, John R. Frith, president, Lake Coal Div., The M. A. Hanna Co.

Canadian Consumption of Industrial Coals, Gordon McL. Hutt, assistant manager, Dept. of Industrial Development, Canadian Pacific Railway Co., and E. Swartzman, senior technologist, Div. of Fuels, Dept. of Mines and Technical Surveys.

Limitations Imposed on Coal Used in Central Canada, George P. Cooper, vice president, and William J. Moroz, combustion engineer, Empire Hanna Coal Div., The M. A. Hauna Co.

The Canadian Power Situation with Particular Reference to Thermal Electric

Steel changes for the S-12V stopers are 24, 30, and 36 inches long. Overall stoper heights are 37, 43, and 49 inches.

Large openings and high vacuum make the Vac-Nu-Matic dust box equally efficient at removing dry or wet cuttings.

Right: The new S-12V Vac-Nu-Matic fills the need for a heavier dust-collecting stoper to speed up roof-bolting operations which are so essential to continuous coal mining.

New Le Roi Dust-Collecting Stoper Speeds Drilling in Hard Top Formations

S-12V stoper features popular Vac-Nu-Matic® dust collection system.

Enables miners to increase drilling footage with less effort.

The new Le Roi S-12V Vac-Nu-Matic stoper combines greater heft, more power, and positive "through-the-drill-steel" dust collection — for faster, dustless drilling of roof-bolt holes in hard top formations.

Its powerful piston impact, free-cutting bits, and powerful rotation assure faster penetration—eliminate stuck steel. The stoper's heavier construction is balanced for easy handling—enables the operator to work more efficiently and in greater safety.

Le Roi's Vac-Nu-Matic dust-collection system is an integral part of the stoper. Since no additional equipment is needed, the S-12V reduces set-up time and can be moved easily to any part of the mine.

Positive Dust Collection

All system components are specially designed to assure positive dust collection throughout the entire drilling cycle. This integrated design keeps dust count in the drilling area well below the approved Bureau of Mines standards.

What's more, the S-12V can be used with two types of bits to cope with changing seam structures. The Vac-Nu-Matic bit is best suited for soft formations, while the 5-hole CRD bit is recommended for medium to extremely hard top structures.

A touch of the operator's finger-tip provides finely graduated feed-pressure control to meet varying requirements. Constant blowing at the chuck keeps cuttings out of drilling mechanism, assuring long, trouble-free service. Other features include socket-type sliding chuck, end-seating automatic valve, positive pressure in both directions, and short stroke.

Feeds and Weights

The new S-12V stopers are available with 28-, 34-, and 40-inch feed legs, and weigh 105, 110, and 115 lbs. respectively. All are adaptable for hand-held operation or jumbo mounting.

Write today for information on the new stopers. Also ask about the new dust-collecting conversion kits that Le Roi offers to change older S-11 and S-12 stopers to cost-saving Vac-Nu-Matic dust collection.

"Vac-Nu-Matic" is the registered trademark for Le Roi's dust collecting stopers, bits, and dust boxes.

WABCO

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Newmatic air tools, portable and Tractair® air compressors, stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

THURSDAY AFTERNOON—G. L. Judy (left), Consolidation Coal Co.; F. D. Cooper, Bituminous Coal Research, Inc.; Donald Wiebe, Joy Mfg. Co.; Paul R. Paulick, Bethel Park, Pa.; J. B. Morrow, Pittsburgh, Pa.

FRIDAY MORNING—J. M. Pilcher (left), Battelle Institute; R. C. Ellman, USBM; J. W. Eckerd, USBM; Thomas Linton, Link Belt Co.; Martial P. Corriveau, Clinchfield Coal Co.; E. V. Tidman, Hewitt Equipment, Ltd.; W. Reid, Battelle.

FRIDAY AFTERNOON—T. R. Scollon (left), USBM; H. B. Charmbury, Pennsylvania State University; E. D. Holdup, Hydro-Electric Power Commission of Ontario; Veleair C. Smith, Charleston, W. Va.; E. F. Osborn, Pennsylvania State University.

Power, C. E. Baltzer, senior engineer fuel and power, Div. of Fuels, Dept. of Mines and Technical Surveys.

Energy and Coal in Canada

Canada is today in the first stages of a drastic change in energy sources, Mr. O'Brian stated. This may eventually lead to growing dependence on atomic energy but it will also demand a substantial increase in coal consumption during the next 25 yr, especially in industrial markets where both oil and gas usage should decline.

It can be reasonably expected that our iron and steel industry will expand and until some other process of reduction of iron ore is developed, blast furnace requirements of coke will provide an expanding market for coal.

The production of electricity from thermal sources is now on the threshhold of a major advance. The Hydro Power Commission of Ontario, which already operates two coal-powered steam plants of 1,464,000 kw capacity, has announced that two new plants of 1,800,000 kw capacity each will be built in the Toronto-Hamilton area. These are expected to be in operation by about 1968. An additional development at Fort William is planned starting with a plant of 100,000 kw. Altogether there is presently planned development of some 5,200,000 kw which, at a 65% factor, will require some 15,000,000 tons of coal per year.

Most of this coal will have to come from American sources although the Fort William development might be supplied with Canadian coal.

In Western Canada, estimates of power requirements by provincial authorities indicate a 1975 demand for lignite, sub-bituminous and bituminous coal of some 7,500,000 tons.

In the Maritime Provinces, coal needed for power generation by 1975 would be about 4,500,000 tons according to latest estimates.

Future needs for coal to generate electricity thus go up to some 27,000,000 tons by 1975 and this figure is probably on the conservative side.

In summary, further decline in coal consumption in Canada should occur over the next 2 or 3 yr but at a reduced rate. There will then follow a gradual increase to a total consumption in 1965 of some 40,000,000 tons, followed by rapid growth to about 61,000,000 tons by 1975.

New Seaway Market

After the completion of the St. Lawrence Seaway (1959), a tremendous industrial growth should take place between Montreal and Lake Ontario. Mr. Frith expects that this growth may involve the consumption of several million tons of additional U. S. coal for thermal

(*Continued on p 169*)

On this stripping operation

CAT* DW21-NO. 470 RIGS ARE DELIVERING LOW-COST PRODUCTION

You see plenty of rugged Caterpillar-built machines at work on this stripping operation in Oglesby, Ill. In fact, you don't see any other make. Years of profitable experience have made this an all-Caterpillar operation.

The picture above shows one of seven big DW21s with No. 470 LOWBOWL Scrapers being push-loaded by a D9 Tractor. And it shows something else, too—how to move material at the lowest cost per yard.

These DW21-No. 470 rigs have capacities for big-volume hauling—18 cu. yd. struck, 25 cu. yd. heaped. But more important than capacity, the No. 470's LOWBOWL design has greater loading efficiency than *any other make* of scraper in its class. Actual tests show that the No. 470 gets its rated capacity load and is on its way while other scrapers are still in the cut, struggling for the last few yards.

And when it has its big load, the DW21 moves it at high speeds, efficiently. Its 300 HP (maximum output) Cat Engine has a Turbocharger to add horsepower at reduced fuel costs. Air is packed into the engine *according to engine load,* not speed. Wide-section, tubeless, 29.5-29 tires provide excellent flotation and furnish greater tractive effort.

Let your Caterpillar Dealer show you how these rugged rigs can move material faster and cut costs on your operation. You can depend on him for sound advice now—for fast service and parts you can trust after you buy.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

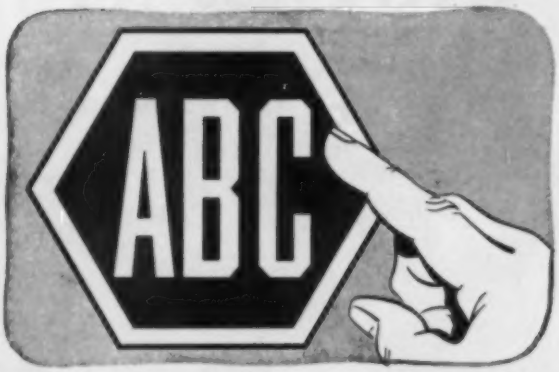
*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

Who's Minding The Store?

. . . in the magazine publishing business, it's

The Audit Bureau of Circulations (ABC) is a cooperative organization that sets standards of good business conduct for its publisher members. Twice each year ABC auditors carefully scrutinize the entire circulation structure and operation of every member magazine. In a very real sense, therefore, they are "minding the store" — making sure that no false or misleading claims are made regarding the size or composition of a magazine's audience.



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You're the boss when you pay money for any magazine. Your vote of confidence and your renewals of subscriptions are dominant in the thinking of editors and publishers. Advertisers are vitally interested, too, and their support helps earn the dollars needed to do a stronger, more useful editorial job for you.

You, the subscriber, win when you buy business magazines that hold membership in the Audit Bureau of Circulations. The ABC symbol signifies that the publication to which you subscribe makes every effort to provide you with the type of informatin you need to do a better, more effective job. It also indicates that the publisher maintains the highest standards of business ethics.

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Roebling Royal Blue Wire Rope goes to any length to prove its **high strength!**

Every inch of every foot of Royal Blue is stronger than any rope you've ever used on *any* job. This on-the-job tenacity helps to make it the most widely and readily accepted rope in Roebling's history. It is but one of Royal Blue qualities that makes for its long service life—on any job you choose. For full details on Roebling Royal Blue Wire Rope talk to your distributor or write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for your copy of "*Wire Rope Recommendations and Catalog*."

ROEBLING

Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation

here's the NEW HD-21...

DESIGNED AND BUILT TO FIT

Now . . . major advances make the Allis-Chalmers HD-21 more productive than ever . . . capable of handling big-tractor jobs of every kind with the efficiency and dependability all open pit operators want and need.

New 225-net-hp turbo-engine

New weight—45,500 lb (bare)

New power train and torque converter effectiveness, simplicity

New longer track for matched traction, flotation

New operating ease and control with work-saving decelerator

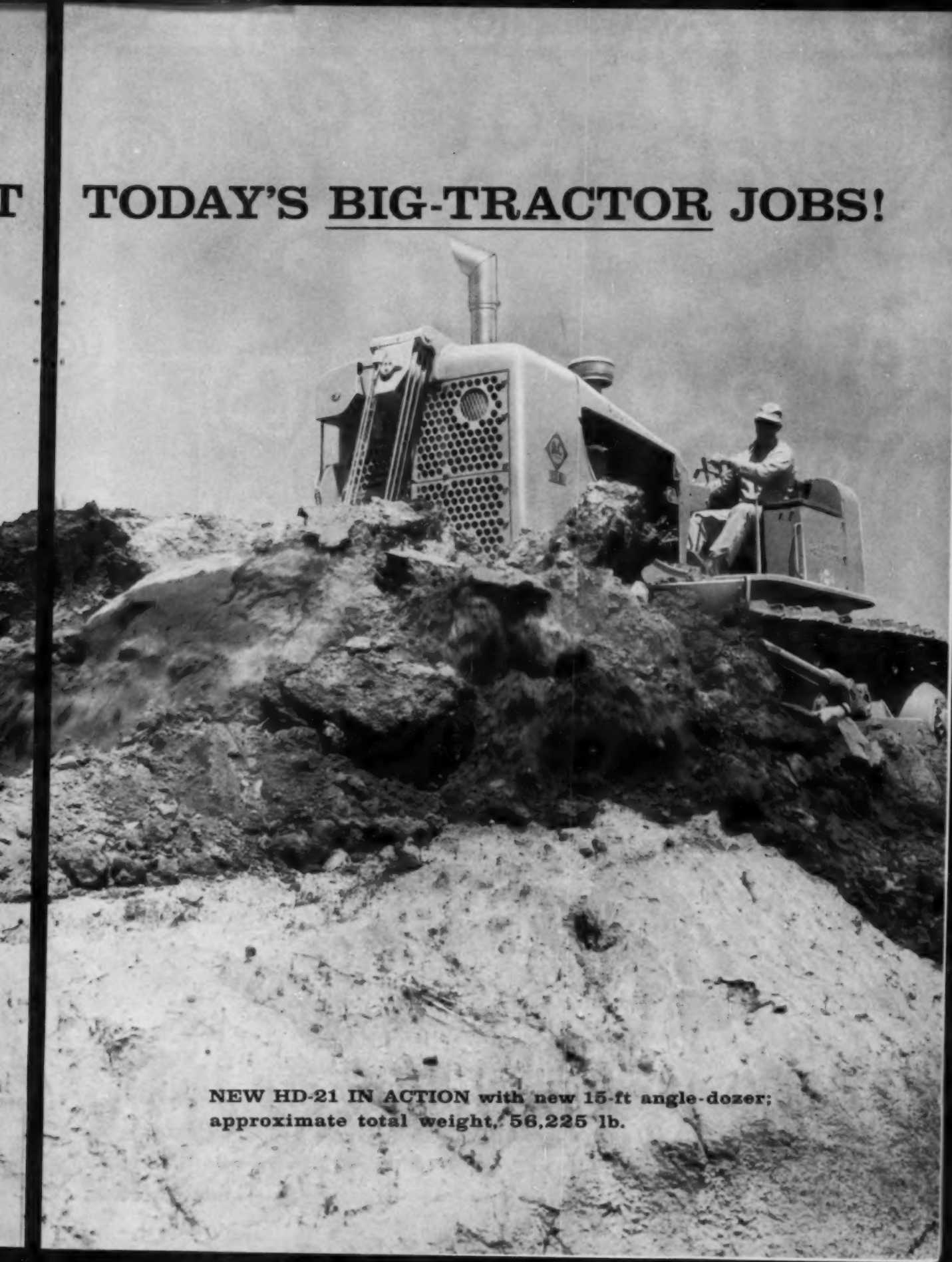
New heavy-duty matched dozers

Here's a big tractor you can depend on to help you on a wide range of stripping and maintenance jobs. Your Allis-Chalmers dealer will be glad to talk to you about the new "21" . . . and to prove its value in a working demonstration on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

TODAY'S BIG-TRACTOR JOBS!



NEW HD-21 IN ACTION with new 15-ft angle-dozer; approximate total weight, 56,225 lb.

News Briefs (*Continued from p 116*)

Canadians favor low tolls, preferably no tolls at all; however, U. S. law authorizing the seaway specifically provides that it must be self-liquidating. The Canadian law contains language making the payment of tolls permissive instead of mandatory.

Is the efficiency of office work in industry trailing too far behind the productivity rate of the factory worker?

R. C. Sollenberger, executive vice president of Conveyor Equipment Mfg. Assn., recently declared that "a factory worker today can produce 14 times as much as his ancestor did a hundred years ago, but productivity of the office worker has increased only 40% in the same time." He voiced a hope for new ideas to increase office efficiency. Reducing wasteful paper work and increasing the use of machines for lifting and carrying jobs will do most to cut costs and raise living standards, he said.

The Veedersburg, Inc., Board of Education and Dr. Alvin W. Ahrens, superintendent of schools, faced with the necessity for replacing an obsolete heating plant, selected the newly-developed EFM-BCR Fire-Jet automatic coal burner, to provide efficient, low-cost steam heat.

The school will have the first heating plant in Indiana equipped to take advantage of the efficiency and economy of fully automatic coal heat. The unit will feature automatic coal handling, automatic ash removal and a complete combustion and control system.

14,000 tons of coal from Wankie Colliery in Southern Rhodesia, were exported to the Sudan recently.

This was the first coal export ever made by Southern Rhodesia. A further 32,000 tons will be exported to the Sudan early in this month.

A fire of undetermined origin was discovered by chief electrician, John Wilcox, in Amigo Smokeless Coal Co.'s mine at Mullens, W. Va.

The blaze damaged the tipple causing estimated losses of about $500,000, an undetermined amount of coal being destroyed.

Morrison-Knudsen Co., Boise, Idaho, has contracted to remove 600,000 cu

(*Continued on p 138*)

LOUIS WOZNIAK, top student at Benton High School, now studying engineering at the University of Illinois, is shown above with Prof. Thomas A. Read, viewing mining equipment. Wozniak, who is 19, could speak no English when he came to America from Rome six years ago. Today, he is the recipient of an Old Ben Coal Co. scholarship to the state university, fruits of his perfect "A" average in high school and his searching interest in engineering; those who have seen and aided in his development are looking forward to great things from Louis.

WELCOME THE MAN WITH THE RED VALISE

Explosives Department **HERCULES POWDER COMPANY** INCORPORATED *900 Market Street, Wilmington 99, Delaware*

See Details in our Ad on Pages 114-115

XR57-6

NOW...boom pendant assemblies with full catalog strength of the wire rope

Rugged J&L boom pendant assemblies with exclusive JalKlamp splices provide extreme strength, longer service life.

JalKlamp terminals are formed by hydraulically pressing the alloy sleeve around the rope. The metal in the sleeve flows into every space between the wires and the strands of the rope. The splice is up to 20% stronger than conventional splices.

The solid steel fittings in J&L boom pendant assemblies are held tight in the loop. They cannot slip.

Investigate why J & L boom pendant assemblies last longer under toughest operating conditions. Send coupon today for complete information.

Jones & Laughlin Steel Corporation
Wire Rope Division
Muncy, Pennsylvania

☐ Please send information on J&L boom pendant assemblies.

☐ Have representative call.

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Jones & Laughlin STEEL

...a great name in steel

Kennametal U7R Bits on a Joy 3JCM Continuous Miner at Moss #2 Mine, Clinchfield Coal Company, Dante, Virginia.

KENNAMETAL* Bits maintain a fast pace at Clinchfield Coal's modern Moss #2

Mining operations at Moss #2 form a chain with no weak links. From preparation of the face to bringing out the coal, each operation of the mining cycle is tightly geared to the next. Here, as in many of the nation's other most modern mines, hard working Kennametal Bits do their share to keep coal moving with minimum delay.

Both continuous and conventional mining methods are used at Moss #2. In the continuous mining sections, despite a hard four-inch middle parting, Kennametal U7R Bits enable Joy 3JCM's to rip out the 54-inch Tiller Seam at high speeds.

In sections where conventional methods are used, the 18-foot face is first undercut with a Joy 11RU Universal Cutter, generally using Kennametal U7R Bits on the 9-foot cutter bar. Five blast holes are then drilled in the face, using Kennametal DDL2 Drill Bits and Kennametal Augers on hand-held drills.

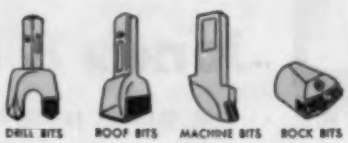
Kennametal Bits in use at Moss #2 have been selected for their ability to stay sharp at high speeds for long production runs between regrinds. Ask your Kennametal Representative to help you select and actually test the Kennametal Bit designed to best match your operating conditions.

KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

*Trademark C-3089

Roof support holes are drilled at Moss #2 by using Kennametal FDH 1⅜" Roof Drill Bits and Roof Bolting Augers on a Fletcher Drill. Bolt holes vary from 24 to 72 inches.

INDUSTRY AND KENNAMETAL ...Partners in Progress



How to boost pit output... cut handling costs

Short turn radius of Rear-Dumps allows quick spotting in restricted areas. Low rear-entry and wide bowl provide easy target for shovel operator... make for fast dipper swing-out, let shovel operator heap maximum yardage without spillage.

The use of modern LeTourneau-Westinghouse Tournapull Rear-Dumps on your pit hauls can cut cycle time, boost production, and lower operating costs. Here's how:

Greater maneuverability — Positive electric power steer, through geared kingpin, permits prime-mover to pivot at right angles for short 90° turns. As a result, unit makes continuous U-turn in less space than Rear-Dump's own length. In dump position, it turns in only about ⅔ of overall length!

There's no need for turntables or elaborate turn-around areas. You spot faster at the shovel, dump faster, and get away faster from pit or dump. On the haul, you make hairpin turns with safety — complete cycles faster. Time saved adds up to extra trips per shift, greater production... with no increase in manpower or equipment investment.

Speeds loading — Low, wide bowl permits shovel bucket to swing in low for faster loading. It permits quick bucket swing-out, even while dipper-door is still open. And because of large target area, spillage is greatly reduced. Production delay during the day for clean-up of pit floor is minimized.

Dumps fast, clean — Flick of switch on control panel instantly activates point-of-action electric-hoist motor. Body raises quickly, to desired angle. At full dump position, edge of bowl is low behind rear wheels... material cannot roll forward to lodge against wheels, nor pile under rear end. Streamlined body sheds stickiest material readily.

Resists body shock, damage — Shovel operator does not have to take it slow and easy when loading. Rear-Dump body is ruggedly built. Simplicity of Tournapull Rear-Dump construction permits using steel otherwise used in frame and sub-frame. In L-W Rear-Dumps this material is used to build greater strength into the bowl itself. Body is all steel — no wood fillers. Floor is lined with heat-treated tool-steel strips, welded to solid billets laid over heavy steel plate.

Ask for complete information

If you're interested in increased production and lower handling costs, it will pay you to investigate high-production Tournapull Rear-Dumps. 3 sizes: 11, 22, and 35 tons. Write for full specifications.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1452-M-1

Big single, low-pressure tires... exclusive power-transfer differential... and 90° electric wagon-type power steer enables Rear-Dump to safely and steadily haul through muck, rock, and soft fill.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

CUT MAINTENANCE COSTS!
SAVE DOWN TIME! on
your Hydraulic System

Keep it clean *with*
SCHROEDER LINE FILTERS

The Schroeder Line Filter is the answer to keeping harmful dirt from slowing down the operation of your hydraulic equipment. This small, all-in-one unit has a large filtering capacity and removes damaging particles too small to be seen.

Here's why SCHROEDER LINE FILTERS are preferred:

- Filter element costs little and is replaceable.
- Fliptop cap permits minute change of element.
- Designed for space-saving installation.
- Many types and makes of filter elements available.
- Minimum cost for maximum filtration area.
- Element protected by built-in by-pass relief.
- Built-in orifice for partial filtration available.
- Working pressures conservatively rated—each unit shop-tested.

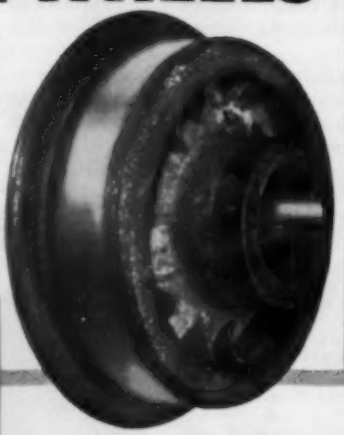
Optional Spin-Dicator provides visual supervision of performance.

SCHROEDER BROTHERS
CORPORATION
NICHOL AVE., BOX 72, McKEES ROCKS, PA.
(Pittsburgh District)
Hydraulic, Electric and Pneumatic Equipment

REDUCE WEAR AND DOWN TIME... Install SCHROEDER LINE FILTERS

acf Load-support
MINE CAR WHEELS

Quick-chilling after casting gives acf Chilled Tread Car Wheels extra resistance to abrasion and wear, gives you real economy through long service life. Gray iron center costs less to mount, reduces vibration and effects of stress concentration. Curved plates support tread at load center: minimize damage to treads.



Cross Section of acf "Load Support" Mine Car Wheel showing: (1) uniform depth of hardening, (2) extra heavy overhang, (3) support at center of tread.

For further information, just ask your acf representative.

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News Briefs *(Continued)*

yds of earth in connection with multi-million dollar construction of coal-washing facilities by U. S. Steel near Wellington, Emery County, Utah.

Allen & Garcia, Chicago, Ill., are prime contractors on the venture on the Price River, which will remove ash and sulphur from coal for the Geneva Works at Provo, Utah, Columbia-Geneva Steel Div. of U. S. Steel.

The Illinois Commerce Commission approved a request of the Illinois Central and other railroads to reduce rates on coal haulage.

ICC representatives announced that beginning Oct. 8, rates would be lowered 40c per ton on lots of 25 carloads or more from Illinois mines to East St. Louis. The CB&Q and Mo-Pac, also obtained approval for rate drops.

Albert Coppe, Belgian vice president of the European Coal & Steel Community, completed his lecture tour of the U. S. in October.

He spoke on results achieved by the six-nation coal-steel pool and on prospects for integration of western European nations.

A $250 scholarship will be given each year to a student attending West Virginia Tech by the Kanawha Valley Mining Institute.

Roy S. Long, chairman of the committee, stated that although the fall semester has begun, the scholarship can still be awarded this year. It will be given to a student who requires financial aid, and who is a prospective student of a subject beneficial to industry.

The Dept. of Justice recently announced that 14 companies had been indicted for illegally fixing retail gasoline prices.

It was charged that the defendants combined to raise the price of gasoline at filling stations.

Poplar Ridge mine, Sturgis, Ky., was closed putting about 300 men out of work, it was recently announced.

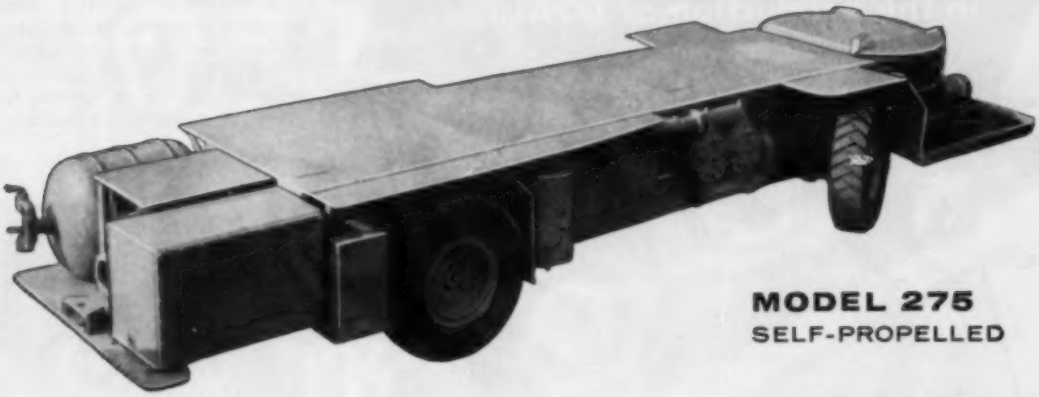
The mine, owned by Peabody Coal Corp., shipped coal to Union Electric Co. Mine superintendent Glenn Dodd said the mine was too expensive to operate for the tonnage mined.

Cleveland Electric Illuminating Co. plans to build a $75 million power plant at Rayland, Ohio, a few miles south of Brilliant, on the Ohio River.

Electric power will be moved to Cleveland 110 miles away by means of a 345,000-v transmission line. Decision to locate the plant on the river was based on the need to reduce transpor-

ACME 275

The "Air to Spare" Portable Compressor



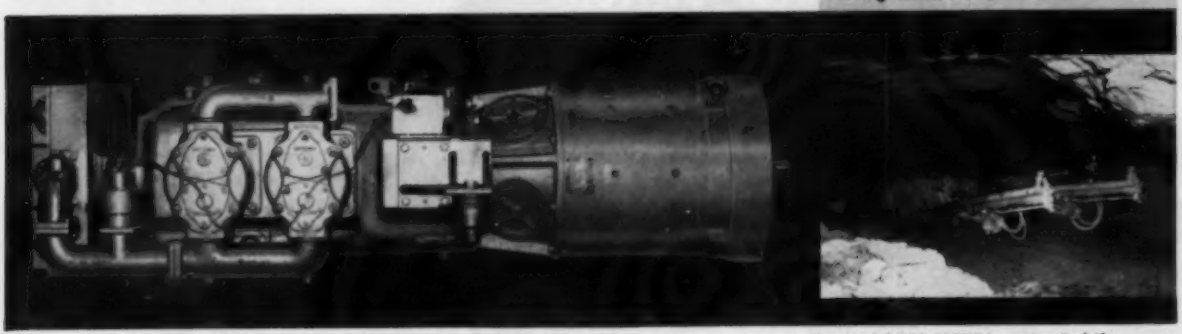
MODEL 275
SELF-PROPELLED

The ACME Model 275 is recommended for taking top and bottom, brushing top or rolls and driving rock headings. Plenty of air assured for operating two drifters or air legs. Air cooled and trouble free with an absolute minimum of vibration.

Also built in non-propelled, skid mounted or track mounted models. Bulletin 275 tells the whole story.

SPECIFICATIONS

Standard Mod. 275-SPR Compressor	
Overall height	25½" plus ground clearance
Ground clearance	Variable, 6", 9", 10", 12" Std.
Overall length	21'6"
Overall width	82"
Actual air delivery	275 CFM
Tire size	8.25 x 15 12 ply
Cable reel (if desired)	Hydraulic drive, will spool 400' #0 cable
Tramming	Hydraulic, 2½ MPH, variable
Brakes	Hydraulic foot brake, mechanical parking brake
Steering	Full hydraulic power steering
Headlights	1 forward and 1 reverse with selector switch
Controls	Dead man type
Turning radius	12'



Two stage compressor which actually delivers 275 CFM of air.

The Model 275-SPRHDJ carries 2 drifter arms with two 3 inch class drifters mounted on 6' feed shells.

ACME MACHINERY COMPANY

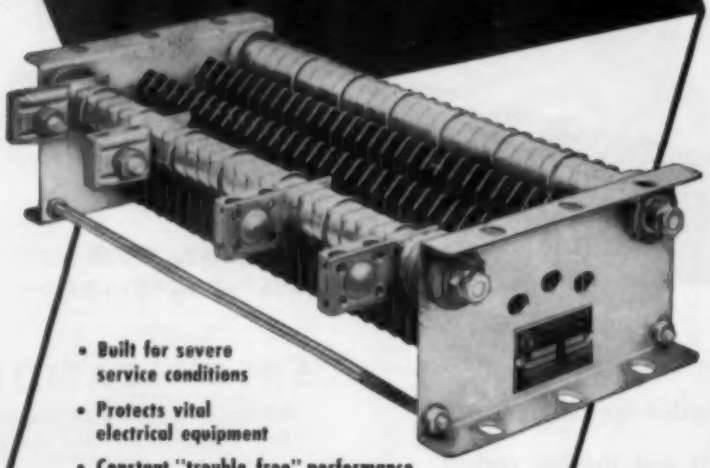
ACME MACHINERY COMPANY

WILLIAMSON, WEST VIRGINIA

WAREHOUSE AND SALES OFFICE
MORGANTOWN, W. VA.

REPRESENTATIVES IN PRINCIPAL MINING AREAS

P-G Steel Grid Resistor
plays an *essential part*
in the production of COAL . . .



- Built for severe service conditions
- Protects vital electrical equipment
- Constant "trouble free" performance

These rugged nonbreakable units have proved their merit in all kinds of service for many years. Made of steel and mica, plus P-G unique and exclusive grid design, P-G Resistors are capable of protecting your most vital electrical equipment, even where service requirements are severe.

Designed to fit your present resistor space

P-G AUTOMATIC Transfer Switch

Single or double trolley and reel

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 to 600-volt service. Complete with cover.

P-G

THE POST-GLOVER ELECTRIC COMPANY
OFFICE and FACTORY—Kenton Lands Road, Erlanger, Kentucky
MAILING ADDRESS—Box 709, Covington, Kentucky

News Briefs *(Continued)*

tation cost of coal.

At a recent meeting of the Central Pennsylvania Open Pit Mining Assn., Ralph G. Kuhns of Philipsburg was re-elected president.

Other officers reelected were vice president, Robert Bailey; secretary, R. S. Walker; and treasurer, Lewis Stein. Lewis C. Hohnka was named executive secretary and B. M. DuBois was re-elected chairman of the board of directors.

PRETTY JO ANNE KESTER, of Nazareth, Pa., was named "Miss Anthracite of the Lehigh Valley" at the Allentown Fair held recently at the Pennsylvania city's fairground.

Joseph E. Moody, president of the Southern Coal Producers Association, predicts he "will live to see the day" when coal will be transported from the southern West Virginia fields to the tidewaters by pipeline.

"The high cost of transporting coal, dure to its bulkiness," he told a civic group recently, "is presently hurting the industry." Moody also declared that the goal of the industry is to find cheap transportation so that it can compete with gas and electricity at the point of consumpion.

Acquisition of Gardner-Denver Co., Quincy, Ill., by Dresser Industries, Inc., of Dallas, subject to approval by shareholders of both companies, was recently announced.

This merger of two important companies brings together combined sales volume of about $350 million a year, it is reported, and total assets of about $250 million. Gardner-Denver shareholders will receive one share of Dresser common stock in exchange for each share of Gardner-Denver common in a tax-free reorganization.

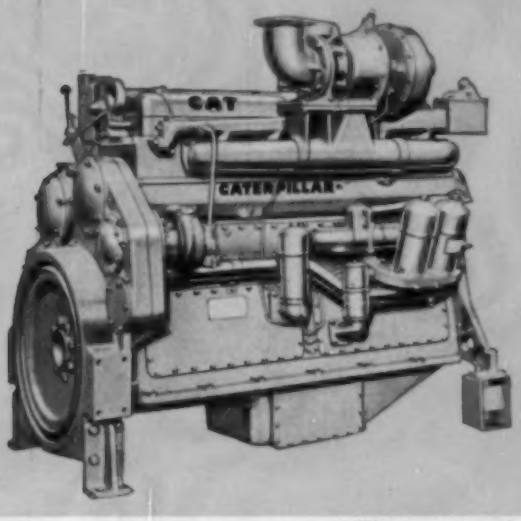
James H. Phalan, chief of the Ken-

CATERPILLAR ANNOUNCES

Another heavy-duty engine in the world's most advanced line of Diesels

D397	D375		D342	D339	D337	D326	D318 (SERIES G)	D315 (SERIES G)	D318	D315	D311
650 HP†	430 HP†		225 HP†	140 HP†	310 HP†	200 HP†	175 HP†	115 HP†	137 HP†	91 HP†	65 HP†

New D353 — 390 HP†



Length 75⅜"
Width 47½"
Height 69¼"

†Maximum output capacity

The engine that delivered outstanding performance in the famous D9 Tractor is now available as the D353 Industrial Engine, Electric Set and Marine Engine. Like all modern CAT® Diesels, the D353 incorporates in its design the advanced features developed by Caterpillar in a quarter century of diesel leadership. Its four-cycle design delivers the long, effective power stroke that puts power to more efficient use than other types of engines. Its fuel system requires no adjustment. There are no cylinder ports to clean. And it operates on a wide range of fuels including premium diesel fuels as well as low-cost No. 2 furnace oil *without fouling.* All these and other features add up to performance that no unit in its power class can match.

With the addition of the D353 to the Caterpillar Engine line, you now have an even wider choice than ever for your requirements. Engines are available up to 650 HP (maximum output capacity) and electric sets up to 350 KW (continuous duty). Either as original or replacement power, there's one among hundreds of different arrangements that exactly meets your needs. Leading manufacturers of machinery can supply these models in the equipment they build.

For complete information about the new D353 and other Cat Diesels, see your Caterpillar Dealer. Let him show you how diesel leadership based on a quarter century of experience can engineer the modern heavy-duty diesels of tomorrow.

The new Cat D353 Engine is a six-cylinder, four-cycle, valve-in-head turbocharged diesel. It is available as an electric set rated at 200 KW (continuous duty) and as a marine engine. A full line of matched attachments is also available — items such as air, electric and gasoline starting systems; clutches; bases; controls and governors; cooling systems and mufflers.

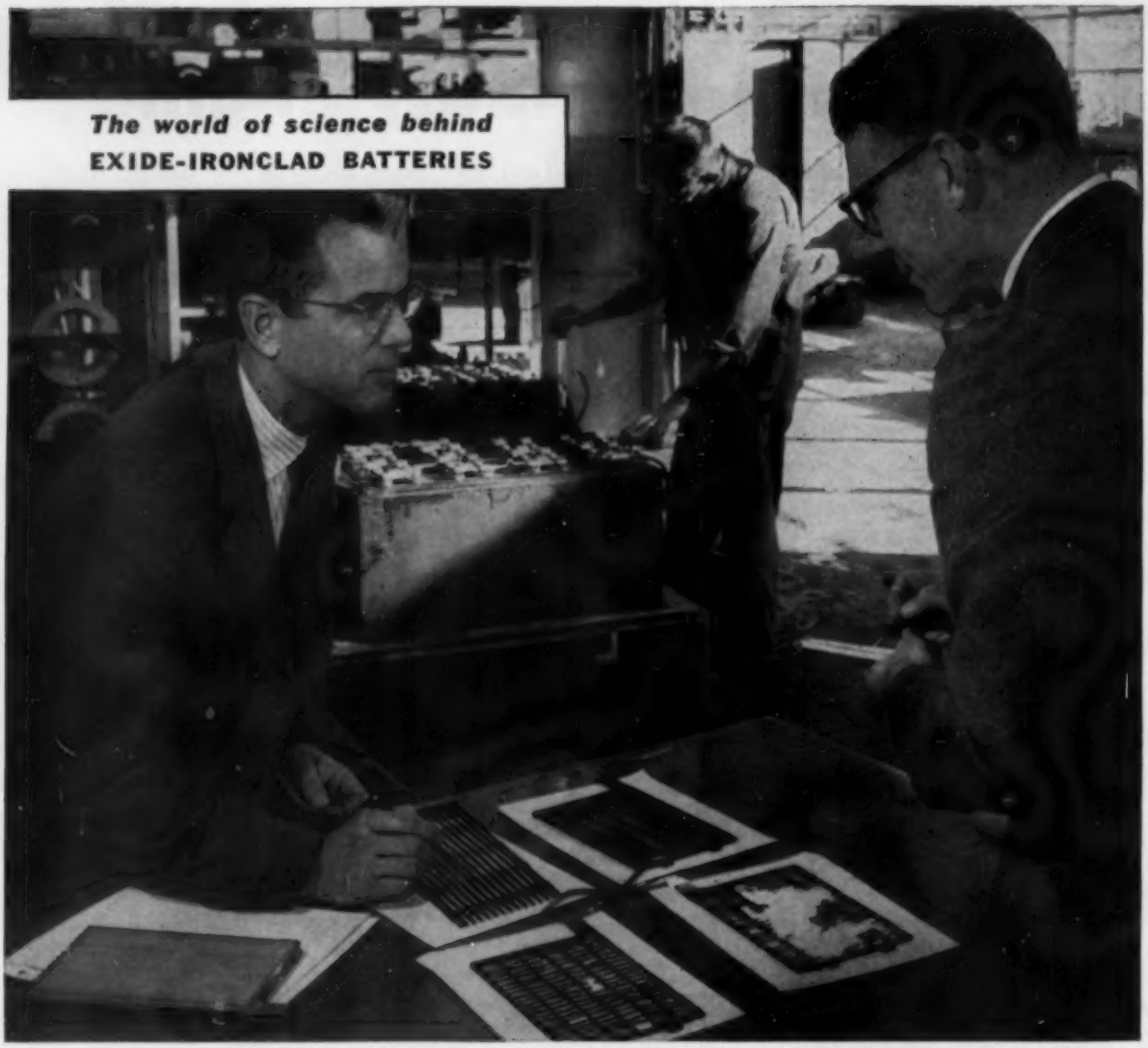
CERTIFIED POWER FOR CAT DIESEL ENGINES

Through the years, Caterpillar Engines have earned a reputation for *honestly rated power.* Now Caterpillar backs this reputation with a *notarized certificate* covering the horsepower capabilities of each engine. You have a right to demand *certified power* when you invest in an engine. You get it when you buy from your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



Being interviewed is W. W. Smith, Divisional Manager, Product Engineering. Grids in back are of Exide's exclusive Silvium. Those in front are ordinary alloys.

"All of these alloys had the same acid test"

At the Exide Laboratories—**Reporter:** Was it a typical charge-discharge test normally used to test battery components?

Smith: Right. And the two positive plate grids with no visible signs of corrosion are Exide's patented Silvium alloy.

Reporter: How about the others—what alloys are they?

Smith: They're standard alloys used in other well-known makes of batteries. But they don't have Silvium's corrosion-resisting ingredients.

Reporter: Where is Silvium used?

Smith: In the positive plates of all Exide-Ironclad and many other Exide Batteries.

Reporter: How does it affect battery performance?

Smith: Every test we've made proves it stretches battery life because the grid resists corrosion—sometimes up to 100% longer.

Reporter: Obviously this is an important feature of the Exide-Ironclad.

Smith: Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.

THE ELECTRIC STORAGE BATTERY COMPANY Exide®

HAUL

HAUL at high capacity.

HAUL the low-cost way.

HAUL with less maintenance.

HAUL anywhere—above ground or below ground . . . from mine to classifying plant, to storage, to car, barge or truck.

HAUL with standardized, pre-engineered Barber-Greene Conveyors.

Barber-Greene standardized conveyors permit faster quotation and delivery, lower cost erection, easier future alteration. Pre-engineered components include: Frames, Trusses, Drives, Take-ups, Feeders, Hoppers, Brakes, Housings, Supports, etc. Ask for the Barber-Greene 192-page Conveyor Catalog.

Over 4,300′ of Barber-Greene Belt Conveyors handle 45,000 to 55,000 tons of coal each month at the Sauceda mine in Palau, Mexico. These conveyors move the coal to the transfer bin for loading, to the stacker for stockpiling and reclaiming . . . or to the processing plant.

This 119′ Barber-Greene Stacker pivots on a curved track to deliver up to 250 tons per hour to any of five silos. Built for the Chicago Wilmington & Franklin Coal Company, this Barber-Greene installation has a capacity that can be quadrupled when required.

55-22A-UPE

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Large Steel Company uses AKINS COAL CLASSIFIERS

Six - 66" Akins simplex, double pitch coal classifiers were installed four years ago in this coal washing plant. Each classifier rakes 60 to 80 tons per hour of minus ¼" product and overflows 0 to 20 tons per hour of minus 20 mesh fines. Efficient Akins classifier dewatering resulted in only 18% moisture in the rake product.

Special, Big Capacity Units

The extremely high capacity and dewatering efficiency of these Akins Coal Classifiers was achieved by a unique modification, developed from the use of Akins Heavy-Media Densifiers in heavy-media cleaning circuits.

This large steel company has purchased for its various coal, iron ore, and fluorspar divisions 34 AKINS Classifiers, Heavy-Media Separators, and Densifiers.

SPECIFY AKINS

The Original Spiral Classifier, and the Only Spiral Heavy-Media Separator

COLORADO IRON WORKS CO.

3800 Race Street • Denver, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

Sales Agents and Licensed Manufacturers in Foreign Countries

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

News Briefs *(Continued)*

tucky Dept. of Mines and Minerals, in a report released a short time ago, held that for the first nine months of 1957, there were thirteen fewer mine accidents than for the nine month period in 1956, in Kentucky.

There is enough anthracite in eastern Pennsylvania to supply the present markets for more than 200 years, the Anthracite Institute disclosed recently.

In its October bulletin issued at Wilkes-Barre, the institute said coal reserves in Pennsylvania amount to "somewhere in the neighborhood of 6.5 billion tons." It was also pointed out that there is a changing trend in coal sizes. "The trend," it said, "is definitely away from the larger and toward the smaller sizes with their lower cost and greater fluidity."

Knisley Moore Co., of Douglas, Wyo., has submitted a low bid of slightly under $900 thousand for construction of 15 miles of road over which Pacific Power & Light Co. will transport coal to its steam power plant under construction near Glenrock, Wyo.

Veryl Hoover, Pacific's Wyoming general manager, said grading will get under way within 30 days after award of the contract and is scheduled for completion by late spring.

A coal mining and electric power development lease has been approved by the Dept. of the Interior, which gives to the Utah Construction Co., of San Francisco, exclusive right to mine for coal and to develop thermal power facilities on the Navajo Reservation, south of Fruitland N. M.

A giant-sized $107 million steam-electric generating facility is under construction in Bergen County, N. J., near the Hackensack River below Ridgefield Park, by the Public Service Gas & Electric Co.

When in full operation early in 1959, the plant is expected to generate 580,000 kw or enough power to supply household needs of two million.

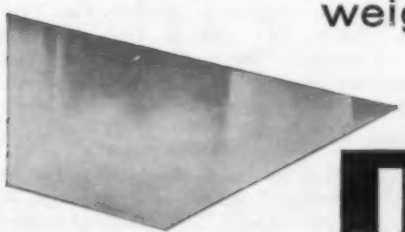
The 36,028,168 net tons of coal shipped over the Great Lakes this season to Oct. 1 was the highest for the period in the last seven years, the Lake Carriers Association reports.

Increased demands for fuel for industrial and domestic use are reflected in the coal trade's healthy pace.

The Pennsylvania Governor's Commission on Rehabilitation is asking for a Federal grant of $142,400 to implement a project for rehabilitation and reemployment of men disabled by silicosis.

JALTEN low alloy high-strength J & L steel

provides equal strength with lighter weight



Jalten permits high design loads with reduction in section. Usual reduction is two gages with weight saving as much as 25%.

High strength of Jalten is the result of balanced chemical composition which is carefully controlled during production. Jalten's strength is retained through fabrication and welding without further heat treatment.

Jalten is available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalten can be purchased in three grades to meet specific requirements for high strength, formability, impact, resistance to corrosion.

Your local distributor can supply you with information on Jalten, or you can write direct to the Jones & Laughlin Steel Corporation, Dept. 411, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

... a great name in steel

EXTREMULTUS is the revolutionary new power transmission belting that combines the shock absorbing properties of an elastic, incredibly strong core of polymer with the unexcelled friction surface of specially chrome tanned leather. In addition to absorbing shock and vibration, EXTREMULTUS will not stretch on fixed centers and runs at speeds over 10,000 feet per minute! Write today for descriptive catalog.

EXTREMULTUS, INC.
405 LEXINGTON AVE., NEW YORK, N. Y.

Current Coal Patents

By Oliver S. North

Dislodging and disintegrating mechanism for a continuous miner, J. D. Russell (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Sept. 17, 1957. Continuous miner having improved mounting means for rotary disintegrating elements, whereby a lateral vibratory action is set up to aid in disintegrating and dislodging coal. No. 2,806,683.

Mineral separating device and method, N. L. Davis, Sept. 24, 1957. Sink-float apparatus and method for separating coal into three products: pure coal, coal middlings, and rock-slate waste. A number of float and sink vessels, each producing two products, are arranged in tandem. Float from each vessel is discharged as finished material, and the sink fraction is fed directly to the next vessel, which contains a liquid medium of slightly higher density. Float from each vessel has higher specific gravity than float from the next preceding vessel. No. 2,807,366.

Gasification of carbonaceous solids, R. P. Tarbox (assigned to Pittsburgh Consolidation Coal Co., Pittsburgh, Pa.), Sept. 24, 1957. Improved process for making water gas by reacting carbonaceous solids, such as high volatile bituminous coal char, with steam in the presence of calcium oxide as a carbon dioxide acceptor. No. 2,807,529.

Fluidized coking of solid carbonaceous materials, J. R. Murphy and J. K. Darin (assigned to Gulf Research & Development Co., Pittsburgh, Pa.), Sept. 24, 1957. High-temperature fluidized coking process employing coal, lignite, oil shales, or the like as charge stock. No. 2,807,571.

Extensible belt conveyors, E. R. Bergmann and J. R. Madeira (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 1, 1957. Improvements in belt conveyor take up loops. An auxiliary idler assembly is provided, whereby the reaches reeved between the idler assemblies will be supported, and thereby prevent rubbing of the reaches on each other. No. 2,808,145.

Continuous mining machine having an angularly adjustable cutter head, J. S. Robbins (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 1, 1957. Cutter head for a McKinlay type miner is readily adjustable for vertical and lateral tilting angles. Flexibility and maneuverability are increased. No. 2,808,249.

Collapsible boring head, E. L. Anderson (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 1, 1957. Improvement in telescopic adjustment for outer ends of boring arms. Worm and gear arrangement provides economy of space and greater range of radial extension and retraction. No. 2,808,250.

Adjustable trimmer bar for boring type mining machine, E. L. Anderson (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 1, 1957. Mining machine of the boring type is provided with auxiliary means for limiting extension of cutter bar relative to the frame, independently of the length of piston stroke. No. 2,808,251.

Mining machine of the planer type having vertically spaced, pivoted cutting members, J. G. Krapels (assigned to Stamicarbon N. V., Heerlen, Netherlands), Oct. 1, 1957. Improved coal mining machine of the plow type having cutters at both ends and adapted to be hauled first in one direction and then the other along a mine face so as to peel coal from the face and load it into a conveyor during both directions of travel. No. 2,808,252.

Continuous miner of the rotating drum type, F. B. Miller (assigned to Goodman Mfg. Co., Chicago, Ill.), Oct. 1, 1957. Construction for cutting head of a continuous miner whereby both sumping and cutting operations can be achieved without use of driving cutter chains. Operation of this apparatus is not interrupted by presence of sulfur balls, hard spots, or the like in the seam. No. 2,808,253.

Coal purification, J. H. Hickey (assigned to Great Lakes Carbon Corp., New York, N. Y.), Oct. 1, 1957. Method for removing silica and other impurities from high volatile bituminous coal, so as to render it suitable for use in the manufacture of electrodes, metallurgical coke, and the like. The coal is treated with a volatilizable fluoride, and the silica is removed as volatile silicon compounds. No. 2,808,369.

Material loading apparatus, H. F. Silver (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Oct. 8, 1957. Improved mobile loading apparatus having means for clearing bottom close to mine ribs without danger of breakage of its mechanism. No. 2,808,920.

Heat treatment of substances for the recovery of decomposition products, K. L. Storrs, Oct. 8, 1957. Improved method of heat treating bituminous coals. Coal is passed through a zone of heat just sufficient to release recoverable constituents in droplet form. No. 2,809,154.

Start to go at 40 below... *FAST!*

SINCLAIR LEADS THE WAY IN SOLVING COLD WEATHER STARTING PROBLEMS

Now there's no longer any need to lose time, man-hours and money due to faulty cold weather starting. Sinclair has what you need to get going – in a hurry!

SINCLAIR STARTING FLUID permits trigger-quick ignition and smoother sustained burning, eliminates the possibility of detonation.

AMPCO-SINCLAIR ENGINE STARTER eliminates the need for "operator know-how"– *automatically* injects the right amount of starting fluid at the right rate of fluid flow for any engine, regardless of design, size or temperature.

ON-THE-JOB ENGINEERING SERVICE: Trained, experienced Sinclair engineers are ready to help you at all times keep your equipment working on the job.

HIGH-QUALITY FUELS AND LUBRICANTS: For easy starting and full anti-wear protection under sub-freezing conditions, you can depend on Sinclair quality products such as – H-C Gasoline, Diesel Fuels, TENOL® Motor Oils, LITHOLINE® Multi-Purpose Grease and OPALINE® Multi-Purpose Gear Lube.

Talk it over now with your Sinclair Representative, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR

Ohio Brass

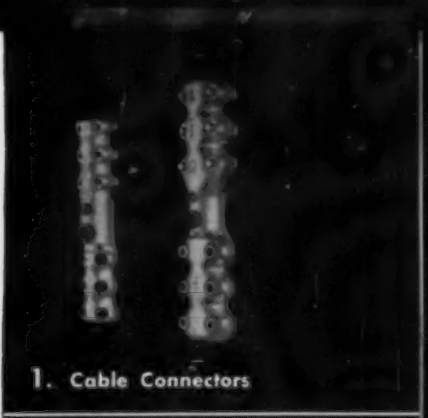
FIRST IN MINE HAULAGE

locomotive equipment, rail bonds, line materials, automatic couplers, safety, and control equipment.

If your problem concerns accessory equipment for mine haulage, you'll find a solution at Ohio Brass -- perhaps even among the O-B products and publications shown on these pages.

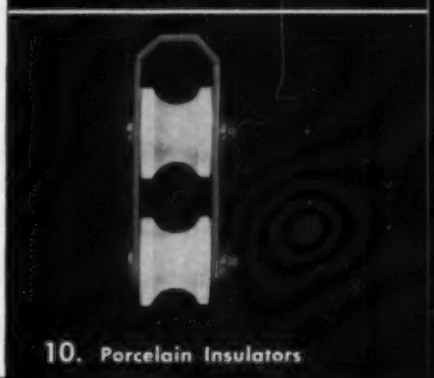
For over half a century, mine operators in this country and throughout the western hemisphere have come *first* to O-B with their coupler, collector, bond, line material, switch, and electrical equipment problems -- for every haulage need, in fact, from simple hangers to the most comprehensive blueprints for complete haulage systems.

To get our monthly "how-to-do-it" bulletins, or more information on any product, fill out and mail the coupon below.



1. Cable Connectors

5. Rail Drills for Wedge Bonding



10. Porcelain Insulators

15. Feeder Safety Switches (Cover Removed)

19. Rail Clamps

OHIO BRASS COMPANY, MANSFIELD, OHIO

4805-M

Name .....

Company .....

Position .....

Address .....

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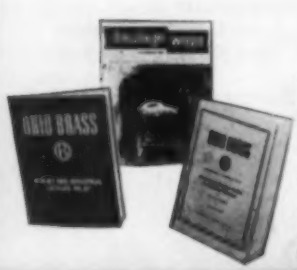
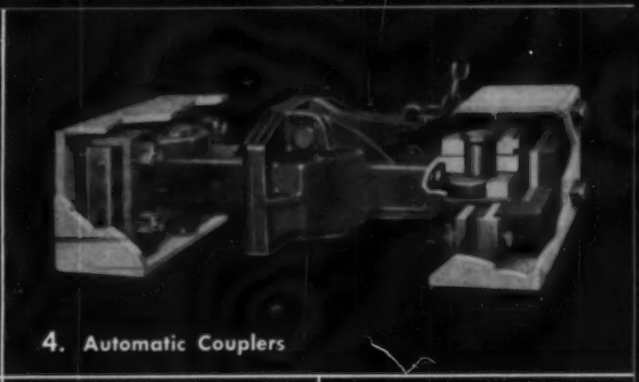
16 17 18 19 20 21 22 Other.....

☐ *A Storehouse of Ideas*—O-B Mining and Industrial Catalog No. 27 is loaded with suggestions for more efficient haulage. Check the box to get your copy.

☐ *A Library of Information*—O-B Haulage Ways brings 8,000 mining men "how-to-do-it" articles and new product information every month. Just check the box to add your name to the list.

☐ *Aluminum Feeder Cable*—Supplement No. 1 to the O-B No. 27 Catalog lists O-B fittings for aluminum cable and describes correct installation procedures. Check box for your copy.

2. Trolley Frogs, Crossovers

3. Expansion Bolts

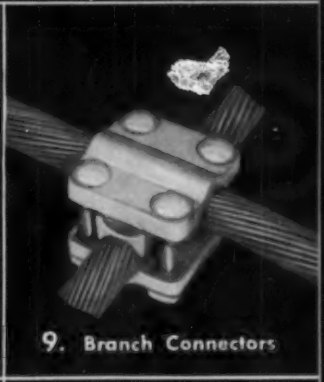


4. Automatic Couplers

6. Trolley Wire Clamps

7. Hanger Adapters

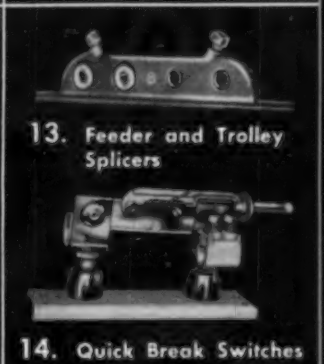
8. Insulated Hangers



9. Branch Connectors

11. Trolley Wire Conditioning Equipment

12. Wheel Collectors

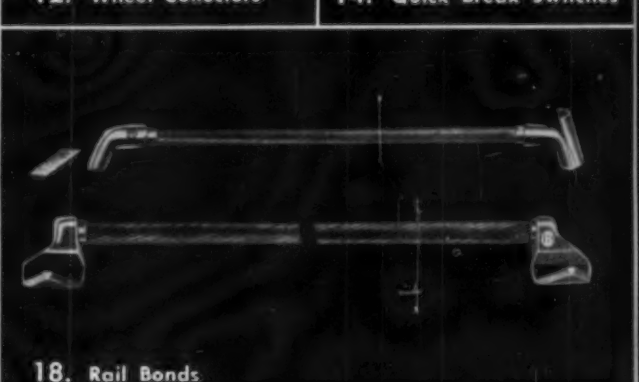


13. Feeder and Trolley Splicers

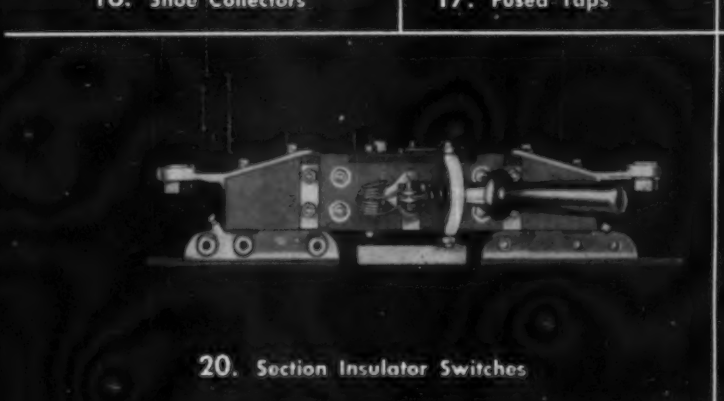
14. Quick Break Switches

16. Shoe Collectors

17. Fused Taps



18. Rail Bonds



20. Section Insulator Switches

21. Combination Feeder Trolley Clamps

22. Bond Welding Equipment

Collyer PORTABLE CORDS AND CABLES FOR MINES...

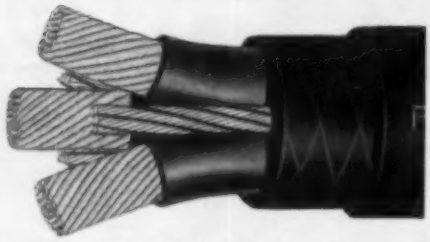
Flat Twin Mining Machine Cable
(Types W & G)

Locomotive Gathering Cable

for use on:

Drills
Cutters
Loaders
Conveyors
Locomotives
Shuttle Cars

. . . and all types of continuous mining equipment above and below ground.



Portable Power Cable 2-4 Conductor Type G
2-6 Conductor Type W

Shovel Cables
(Classes A, B, C and D)

Concentric Mining Machine Cable

Portable Cords (Types S, SO, SJ, SJO)

Remote Control and Drill Cords

LIVE BETTER ELECTRICALLY

Collyer

INSULATED WIRE CO.
245 Pawtucket Ave.,
Pawtucket, R. I.

Personal Notes

Scott R. Wolfe, chief construction engineer, who has been associated with Cannelton Coal & Coke Co. and Lake Superior Coal Co. at Cannelton, W. Va., for 28 yrs, retired recently. He will make his home in Florida.

Neal Spillman, 66, of Earlington, Ky., died after a long illness. Mr. Spillman was with two life-insurance companies, and later was in charge of properties for West Kentucky Coal Co. until ill health forced his retirement.

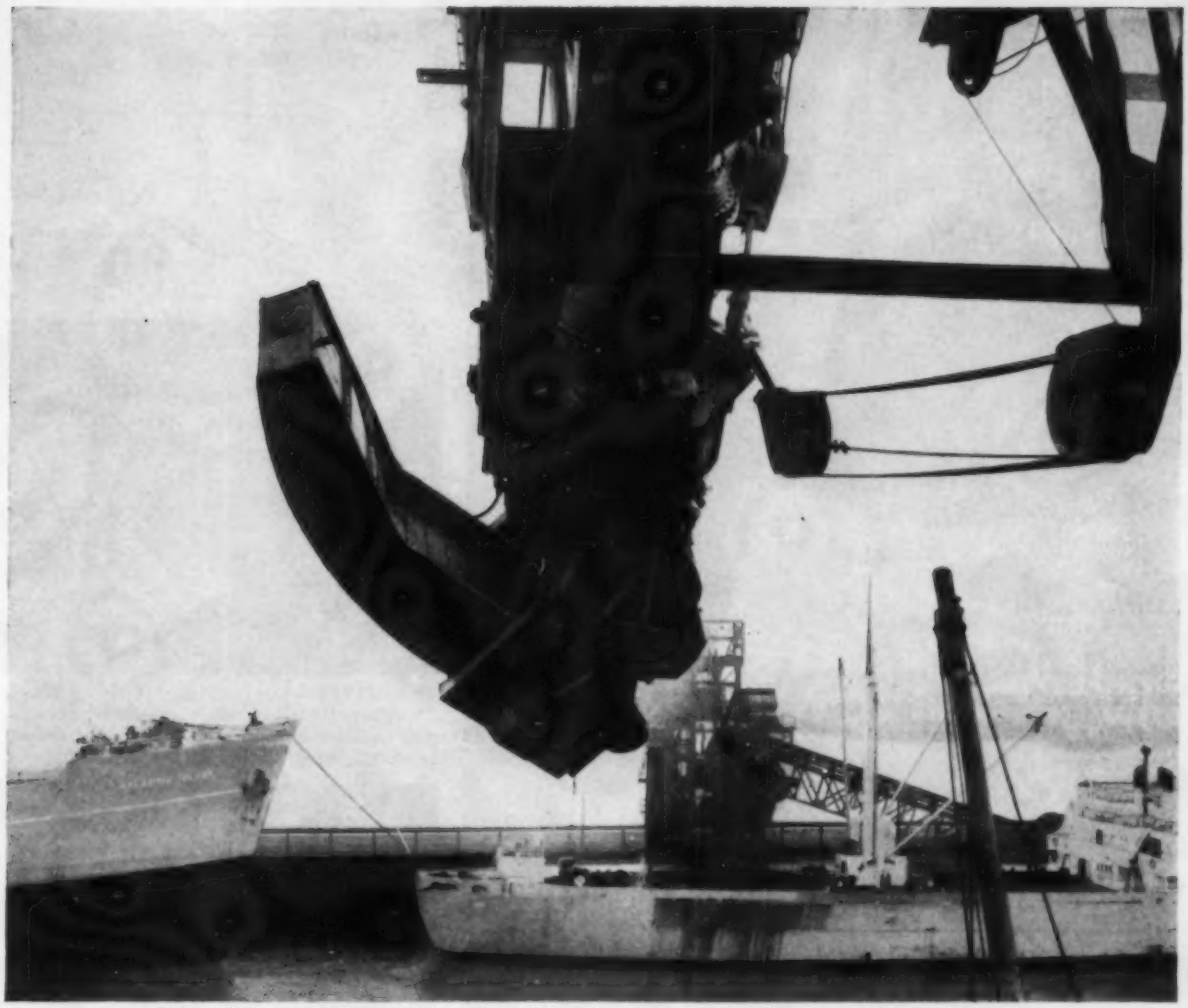
Maurice Deul, former research geologist for the U. S., has been assigned to the Pittsburgh laboratory of Bituminous Coal Research, Inc. His first task is a study of the form of sulfur in coal to discover new methods which will permit a removal or decrease in the amount of sulfur in metallurgical and steam coals.

Robert L. Sankey of the Pittsburgh staff of Bituminous Coal Research, Inc. has been promoted to publications. He is widely experienced in visual materials and in industrial operations. He will help to expedite BCR mechanical engineering activities by developing visualizations of experimental equipment for evaluation prior to undertaking their construction.

Some changes were reported in the Glen Alden Corp. recently. Joseph J. Zimmerman of Plymouth, superintendent of Huber has been switched with Ralph H. Hodgson, Plymouth, superintendent of Lance.

Two new officers of the Kentucky Coal Association were elected by the groups executive committee at a recent meeting. **Fred B. Bullard** and **C. D. McDowell** were elected executive secretary and treasurer, respectively, for the organization. The two men were selected to fill a vacancy created by the death of George S. Ward of Harlan, who died on September 21. The Kentucky Coal Association serves the coal industry in public relations and governmental affairs on a state level.

James C. Gray, vice president, Coal Operations, U.S. Steel Corp., has been chosen to head a 48-man committee, which will work out plans for the 1958 Coal Convention of the American Mining Congress. More than 2,000 men from every coal producing area in the nation will attend the meeting, which will be held in Cincinnati, May 5-7. The group will meet in Pittsburgh during November to formulate plans for the 3-day convention, which will include many discussions by experts on every phase of coal production and preparation, at both deep mines and coal stripping.



At world's most modern coal docks, Newport News, Va., C&O uses coal trimmers of Lukens "T-1" Steel.

New Coal Loading Machine is tougher and lighter— made with Lukens "T-1" Steel

TRADEMARK

Tough, weight-saving Lukens "T-1" gives this trimmer added mobility.

When the C&O Railway designed this huge new coal trimmer, they chose Lukens "T-1" steel for its combination of high strength and toughness—plus ready workability. Construction required less steel, produced outstanding abrasion resistance.

Now with stepped up efficiency, this mammoth machine easily and economically deposits 2,000 tons of coal an hour deep in the holds of ships—with a minimum of wear and maintenance.

Whether you handle coal, stone, gravel or metal ores, Lukens "T-1" steel used in areas hardest hit by punishing abrasive impact will save you money, too. It has tripled the life of rock driers. The 321 minimum Brinell quality has been known to outlast previous metals by 18 to 1 in quarry wear plates. Chutes, hoppers, and mine cars are other typical applications.

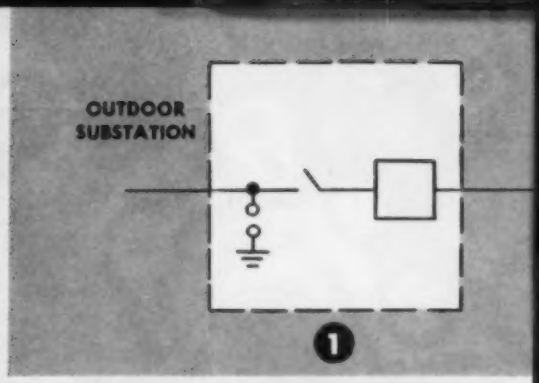
And Lukens "T-1" steel retains its remarkable toughness at temperatures well below zero. Send for our informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 962, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS

Helping industry choose steels that fit the job

ENGINEERING REPORTS:

CARRYING coal at R&P mine, shuttle cars are powered by a-c underground electrical distribution system.



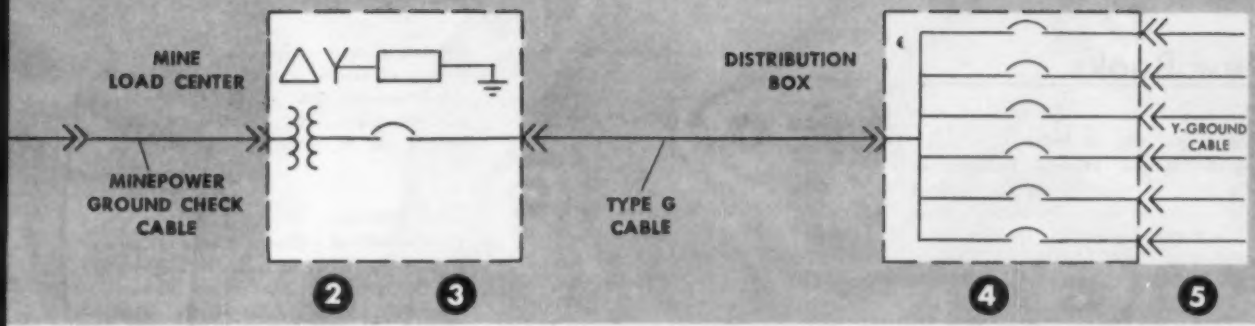
❶

❶ **INSPECTING** the surface substation is James Wiley, R&P asst. supt. of power. Substation includes disconnect switch, power circuit breaker, ground current limiting resistor.

❷ **TRANSFORMING** incoming voltage from 4160 v to 480-v operating level is skid-mounted 300-kva mine load center. Versatol Geoprene® ground-check cable is in foreground.

®Reg. trade-mark of General Electric Company.

❸ **PROTECTING** low-voltage circuits is this air-type circuit breaker in the mine load center. Flexible Type G portable cable, right, carries 480-v operating power to the distribution box.



ONE-LINE DIAGRAM of R&P's a-c mine electrical system. All components are system-engineered for complete integration.

With General Electric a-c system . . .

R&P cuts initial underground-mine costs 30%, provides greater personnel protection

A new concept in underground-mine power distribution, a completely integrated a-c system, has been adopted by Rochester & Pittsburgh Coal Co. for its recently opened O'Donnell No. 2 mine. Initial costs proved 30% less than an equivalent d-c arrangement and new grounding protection built into G-E cables provides greater personnel and equipment safety.

Working with Rochester & Pittsburgh engineers, G-E system engineers designed a complete electrical system which takes 4160 volts underground to a skid-mounted mine load center and supplies 480-v operating power close to equipment at the mine face.

R&P officials cite these principal advantages of this new a-c mining system: initial cost was approximately 70 percent of a d-c system; new-type ground conductor built into G-E trailing cables provides greater personnel and equipment protection by generally limiting faults to phase-to-ground, rather than phase-to-phase; portable mine load centers kept close to the working face decrease voltage drop and increase efficiency of new, highly mechanized mining machinery; maintenance costs should be considerably lower since commutators and brushes are eliminated; a-c power equipment is smaller, more portable.

If you are planning a new mine electrical distribution system or a major addition to an existing installation, find out how these a-c system advantages can be engineered for you. For complete information on a-c underground mining, contact your nearest G-E Apparatus Sales Office or write to General Electric Company, Section 663-48, Schenectady, N. Y.

Engineered Electrical Systems for the Coal Mining Industry

GENERAL ELECTRIC

4 DISTRIBUTING power to mining equipment is this distribution box completely built to G-E specifications. Type G cable in foreground is designed to resist twisting and rough wear encountered with frequent movements of the power system.

5 POWERING this mine loading machine is G-E Y-ground portable cable. A Y-shaped ground conductor separates the three insulated phase conductors, generally limiting faults to less severe phase-to-ground faults in event of cable damage.

New Books

Mineral Industry in India

Progress of the Mineral Industry of India tells of progress in the various fields of mineral industries in India during the period 1906-1955. The book was published as the Golden Jubilee Volume of the Mining, Geological and Metallurgical Institute of India. Recording the advances of the mineral industry in India in the last 50 yr, the volume commemorates the 50th anniversary of the Institute. Geology, fuels, metals, nonmetallics and palaeontology are major subjects in the work. *567 pp. 7⅝x10-in; cloth. The Mining, Geological and Metallurgical Institute of India, 27 Chowringhee, Calcutta, India.*

Welding

Welding Handbook, edited by A. L. Phillips, is the first section of the fourth edition of the five-volume Welding Handbook. It deals with the fundamentals of welding and has chapters on standard welding terms, engineering tables, welding metallurgy, properties of welded joints, thermal and mechanical treatment of weldments, design of welded joints, estimating costs, inspection, mechanical testing of welds, statistical control and safe practices. *560 pp, 420 illustrations and 86 tables. $9, American Welding Society, 33 W. 39th St., New York 18, N. Y.*

Coal Storage

Weathering of Illinois Coals During Storage, by H. W. Jackman, R. L. Eissler and F. H. Reed. This report discusses the effect of stockpiling on the coking properties of Nos. 5 and 6 coals from southern Illinois. Tests were made during summer and winter. *22 pp with 18 tables, 6¾x9¾-in; paper. Circular 227, Illinois State Geological Survey, Urbana, Ill.*

Longwall Mining

Modified Longwall Mining With German Coal Planers, by W. A. Haley and J. A. Dowd. This report summarizes results with coal planers in five mines in West Virginia and Pennsylvania. *R. I. 5355, Publications-Distribution Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa.*

Coal Research

Report of Bureau of Mines Research and Technological Work on Coal and Related Investigations, 1955, by F. P. Carman, M. R. Geer and H. L. Riley, contains recent studies by the USBM in the mining, processing and utilization of coal. Intended as a reference for students, scientists and others interested in coal, the report discusses Bureau research and technological work on coal during 1955. *I. C. 7794, Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Wood Preservation

Wood Preservation Statistics, 1956, compiled by Gordon D. Merrick, contains information from 325 wood-preserving plants. Data are compiled in tabular form for easy reference. *7¾x10¾-in; paper. American Wood-Preservers' Association, 839 17th St., N. W., Washington 6, D. C.*

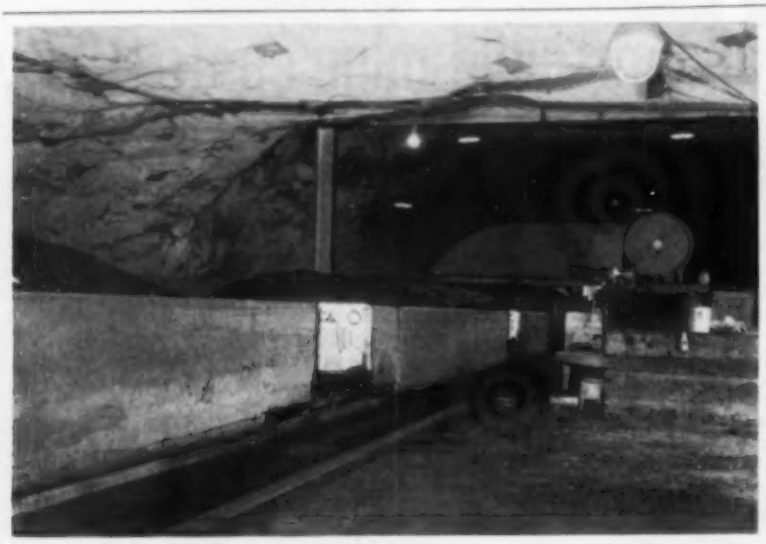
Mineral Production in Illinois in 1956, by W. L. Busch and W. H. Voskuil summarizes the output and value of Illinois mineral products. *Circular 238. 36 pp. 6¾x10 in; paper. Illinois State Geological Survey, Urbana, Ill.*

The following publications may be obtained free upon request to the Publications-Distribution Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10½-in; paper; mimeo.

Preparation Characteristics of Coal from Bell County, Ky., R. I. 5357.

Preparation Characteristics of Coal from Lee County, Va., R. I. 5358.

Full-Shift Dust Exposure in Some Bituminous Coal Mines, R. I. 5361.



haulage capacity...

Place: Dante, Virginia
Operator: Clinchfield Coal Company
Car Dimensions: 21'6" (body)
Width: 7'6"
Height: 33" above rails
Weight: 8500 lbs. (empty)
Capacity: 335 cubic feet (level load)
442 cubic feet (crown load)

where can you match it?

Since 1915—
Pioneers in
haulage equipment

DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY, OHIO

"I like Bethlehem Track Bolts for three reasons: Sharp, rolled threads. Strong heads and necks. And a variety of sizes."

Spikes and machine bolts, too!

BETHLEHEM STEEL

Foreign News

GERMANY

Coal Prices Up

The Ruhr mining companies have announced coal price increases of $1.12 per ton and a $1.48 hike for coke. Another increase of about 40c per metric ton is reported planned. Germany's coal prices, the mining companies state, are still the lowest within the European coal and steel community, but the price increase is certain to be a heavy blow at economic minister Ludwig Erhard's efforts to keep German prices stable. The government, it is said, plans to abolish the present turnover tax on imported coal. This would lower the price of U. S. coal by 57c, but would nevertheless make it competitive only in coastal regions. Reports say that the increase was made necessary by recent increases in wages and pensions pushed through by labor unions or granted by the pre-election parliament, and the move will doubtlessly have an impact on prices in other industries.

ARGENTINA

Imports Australian Coal

In accordance with its new policy of obtaining coal outside the dollar area in order to save its scarce foreign exchange, Argentina is negotiating with Australia for purchase of 300,000 tons annually at $24 a ton. Reports say that Australian coal quality is not known, since they are a new exporter. There are several advantages which the Argentine government hopes to gain. Purchases could be payed in sterling, a currency in which the country is relatively rich, due to its meat sales to Britain. Also, the price is lower than European prices and nearly on a par with U. S. prices.

AUSTRALIA

Steel Holder For Safety

Mt. Isa Mines Ltd., an Australian mining company controlled by American Smelting & Refining Co., is now using a specially designed steel holder for shrink stope miners. The holder simplifies collaring of back holes and others that might be dangerous or awkward due to a dangerous position. According to Australian reports, one man standing in the gadget can bore any hole in the stope.

GREECE

Brown Coal Briquet Plant

In line with the plan to open brown coal deposits in Ptolemais, the Hellenic Co., producers of chemical products and fertilizers, Athens, Greece, has placed an order for a complete briquet plant with an annual capacity of 360,000 briquets with the German firm, Kloeckner-Humboldt-Deutz, Cologne. The plant which will be the first Greek brown-coal briquet installation is scheduled to start operations in March, 1959.

GREAT BRITAIN

Coal-Oil Process

England is reported to be experimenting with the Fischer-Tropsch process of converting coal to oil, in order to reduce its dependence on imported oil. There are indications that success may not be

They do it with HALF the Stamler equipment they thought necessary!

18 TONS of Coal PER MINUTE!

with { 1 STAMLER Car Spotter
1 STAMLER Loading Station

THIS story concerns a mining company that is big, smart and sharp with a pencil. To bring production in a particular spot up to a total that figures out at 18 tons per minute, they ordered two Stamler Car Spotters and two Stamler Loading Stations. BUT . . . before they ever got the second set of equipment installed . . . they had reached their goal with only ONE car spotter and ONE loading station. In plain language — they did their job with HALF the Stamler equipment they thought was necessary! And they're doing it consistently — loading peaks of 18 tons of coal per minute — day in and day out! This story speaks for itself. Unusual as it may seem, it is right in line with the experience of other Stamler users. Why don't YOU find out what STAMLER equipment can do in YOUR mines?

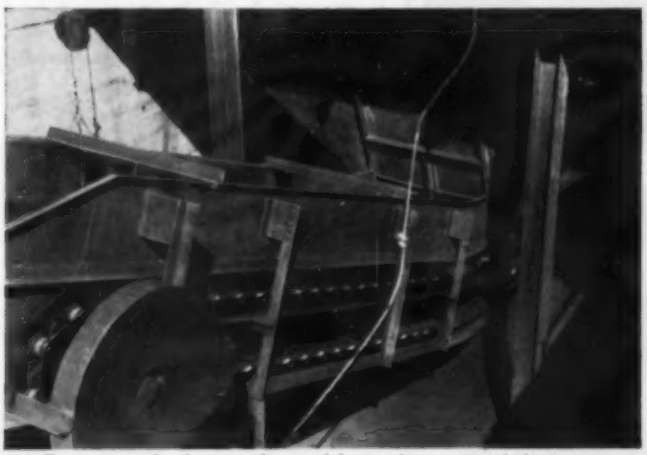
STAMLER *Hydraulic* CAR SPOTTERS

SCHROEDER BROS., Exclusive Eastern Sales Agent
Pittsburgh, Pennsylvania
UNION INDUSTRIAL CORP., Carlsbad, New Mexico

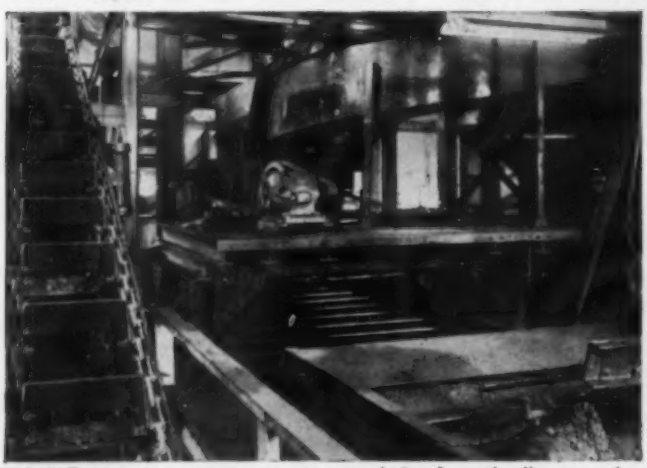
W. R. STAMLER CORPORATION
PARIS, KENTUCKY

SALMON & CO., Birmingham, Alabama
WESTERN SALES ENGINEERING CO.,
Salt Lake City, Utah

Jeffrey belt conveyors carry coal to a Jeffrey Baum jig at a large West Virginia coal preparation plant.



A Jeffrey apron feeder transfers coal from a hopper to a belt conveyor at Western strip mine.



This Jeffrey scraper conveyor transports sludge from the jig at another West Virginia coal company.

For every coal handling job there's a

JEFFREY CONVEYOR or FEEDER

Efficient handling of coal in the preparation plant enables you to utilize washing facilities to obtain maximum production. Jeffrey has a complete range of feeders and conveyors to answer any handling problem at your coal preparation plant.

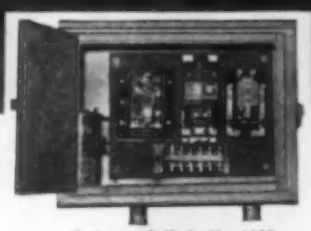
If any or all of your handling operations need modernization, let Jeffrey engineers consider your problem. For information on coal handling equipment to give you most efficient operation, get in touch with The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Use ENSIGN

SAFE, DEPENDABLE CONTROLS
for Underground Belt Conveyors



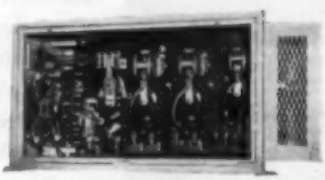
Ensignoar Bulletin No. 1125

ENGINEER SAFETY CONTROL FOR CONVEYOR SYSTEMS

Consists of switch control and two contact wires stretched along conveyor line. Stops and starts belt conveyor when the two low voltage wires are pressed together. Time relay allows motor to come to complete stop before restarting.

ENSIGN STARTERS

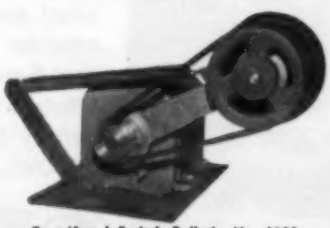
For use with adjustable speed motor for belt conveyor service. Interlocked reverse switch prevents plugging—two speeds forward, half speed only in reverse. Full field in starting and speed-up for shuttle car dumping provided. Larger sizes with four steps acceleration available.



Ensign Starter Bulletin No. 5390

CENTRIFUGAL SWITCH

The watchdog of your conveyor line. Switches are located one to each section of belt. Prevent jams and damage from belt slippage. Provide sequence operation of multiple conveyors, including shaker or chain conveyors feeding onto belt conveyors. Dust-tight or Explosion-tested enclosures.



Centrifugal Switch Bulletin No. 1100

ENSIGN

ELECTRIC AND MANUFACTURING CO.

914 Adams Avenue Huntington 4, W.Va.

Foreign News *(Continued)*

too far off, and more research has been commissioned by the Fuel Research Board. The Fischer-Tropsch process, which was used by Germany during the war to make small quantities of oil, has not been considered practical for large commercial production. However, there are several reasons, it is said, why the board thinks that the plan may be more useful and economical than it has been before. In the operation, a mixture of gaseous carbon monoxide and hydrogen, obtained directly from coal by blowing steam through a heated layer of it, is made to combine into a mixture of oil-like products in the presence of a catalyst. British reports say that there have been improvements in the manufacture of the synthetic gas by use of a new catalyst, which is suspended in molten wax. Gases are bubbled through this catalyst, and tests have revealed that greater percentages of the final oil product may be obtained. It is the belief of experimentors that enough coal for use in such a project will be available by the next decade due to the advent of atomic power. Major problems yet to be encountered are adequate control and quality.

India

New Coal Mines

India's government plans to open up new coal mines in conjunction with its long range plan to mechanize and develop its industry. Its hopes to produce 22 million tons before long, coal being India's main source of energy. Till now, the USSR has provided, almost entirely, the technical know-how needed for new industry. Reports indicate that some pressure is being brought to bear on both the United States and Britain to make their bids of technical aid as regards opening of the new coal mines.

Japan

Workers on Strike

Japanese coal workers joined a million other workers in walking off the job recently to back up a drive for general increases in pay and retirement allowances. The strike, disrupting the country's industry, is an annual struggle created by leftist unions, according to reports, and the coal miners have declared that they are out for an indefinite duration.

Czechoslovakia

Coal Production Increase

A report by the Czechoslovakian government states that hard production in that country increased to 23.4 million tons while brown coal production

Check these three points on the Oliver Horizontal Filter for coal dewatering

Capacity — Provides exceptionally high, continuous dewatering capacity at minimum floor space per ton handled . . . no degradation.

Range — Inherent design characteristics permit handling of wide size range from ½ inch to 0 mesh. First, coarse sizes are applied to form bed; then, fine coal including cyclone underflow is added.

Low Cost — Initial and operating . . . utilization of gravity means improved filtration efficiency . . . simple, rugged design requires little maintenance. There are no high-speed moving parts.

If you have a coal dewatering problem, chances are application of the Oliver Horizontal Filter can solve them. For more complete information, write for Bulletin No. 7201. Dorr-Oliver Incorporated, Stamford, Connecticut.

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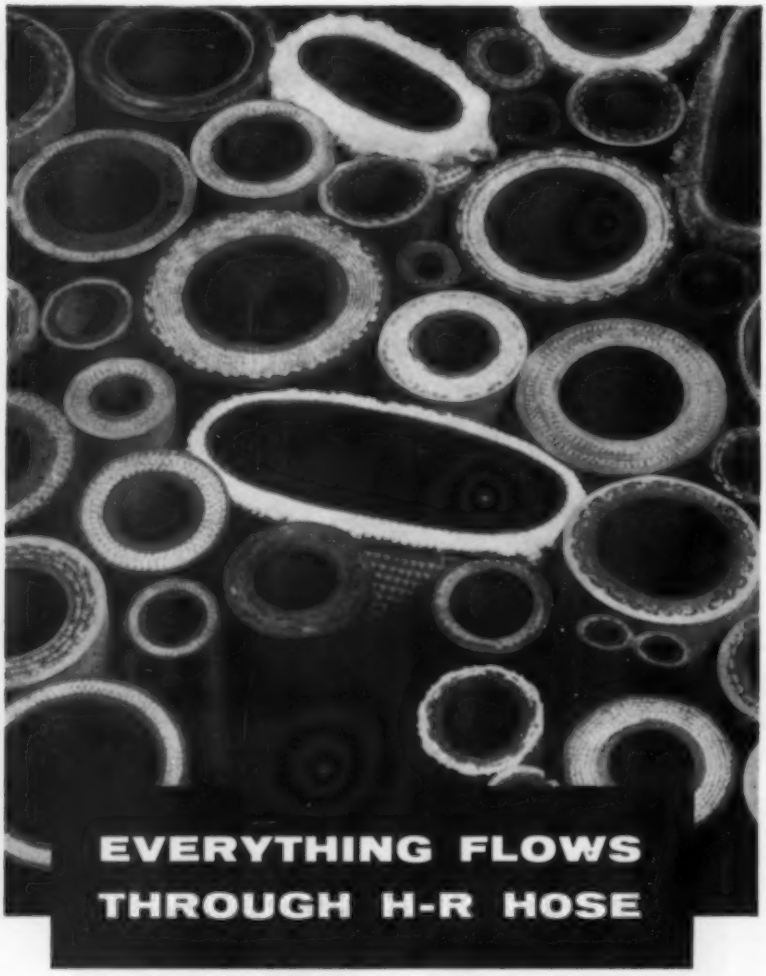


Well, almost everything does. Dirt, dust, alcohol, acid, fruit juice, compressed air, gasoline, agricultural sprays, molten sulphur, steam, mud, insulation materials, oil, foam, sand, oxygen, acetylene, and liquid propane are only some of the products for which H-R hose has been in service for years. In nation-wide stock for immediate delivery is H-R hose specially engineered by Hewitt-Robins to suit practically every job requiring top-quality, long life hose.

Whether you require abrasion resistance, acid resistance, short lengths or long lengths, wide diameters or narrow, pressure performance, or any of a variety of carcasses or covers, Hewitt-Robins can supply you with a tough wearing hose certain to give long, reliable performance. To order the type and size best suited to your requirements, call your nearest H-R representative, or Hewitt-Robins, Stamford, Connecticut.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS... POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE... VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

Foreign News *(Continued)*

amounted to 46.3 million tons. Lignite accounted for 2.17 million tons last year. The same source declares that Czechoslovakia is now 12th in world coal production; it goes on to say that new hard coal mines with an annual capacity of 816 million tons, brown coal mines with a capacity of 9.7 million tons and lignite mines with an annual production of 1.5 million tons have been put into operation during the years 1949-1956.

USSR

Hard Coal Production

Hard coal production figures compiled by the Anthracite Institute show that Russia out-distanced all competitors for the lead in that field last year. A total of 142,300,000 tons of anthracite was produced throughout the world, according to information based on figures from a recent issue of "International Coal Trade." The United States—actually, Pennsylvania—produced 26,218,000 tons but was second to Russia with a production of 66,300,000 tons. Other countries and their 1956 anthracite production, including some undetermined semi-anthracite tonnage, follows: West Germany, 12,204,000 tons; France, 10,916,000; Belgium, 6,963,000; China, 5,000,000; United Kingdom, 4,229,000; Spain, 2,284,000; North Viet-Nam, 2,101,000; Republic of Korea, 1,817,000; Japan, 1,414,000; and North Korea, 1,400,000. It appears that with Russia's leadership in coal production, she has been able to put her foot in the door to deliveries to western countries. Recently, Austria signed a trade agreement with the USSR providing for a 1958 import by Austria of 500,000 metric tons, whereas frame-type agreements for 1959 and 1960 speak of Soviet deliveries of 700,000 metric tons, and 900,000 metric tons, respectively. The United States leaders are undoubtably worried, both for western currency's sake and for propaganda reasons, showing clearly that coal's impact on the world market remains vital.

Hungary

Plans For Future

Reports from Hungary indicate that coal production is picking up there. The shortage of manpower which had plagued the industry has been eliminated, it is said, and in places there exists a surplus of miners. The coal industry has also introduced a new system of wages which has upped the miners' earnings as much as 33%. It was also disclosed that a new 3-year economic plan would be put into operation beginning 1958. A target figure on production is envisaged at 25.8 million tons of coal by 1961.

VERSATILE BUCYRUS-ERIE STRIPPER WITH THE RIGHT CAPACITY AND REACH

A Bucyrus-Erie 88-B dragline strips rock and shale overburden at Beaver Valley, Pa. The machine is owned by the Dean Coal Company, Ramey, Pa.

Whether your stripping operation requires a dragline, stripping shovel or a standard shovel, the Bucyrus-Erie 88-B offers the flexibility to do the job to your satisfaction.

With either of these three front ends, the 88-B puts more than 75 years of Bucyrus-Erie know-how on your job. It is a dependable, *basic* excavator — designed to function efficiently with whichever front end best fits your needs.

The 88-B's big diesel power plant, with your choice of torque converter or direct drive, provides plenty of power for the toughest digging and transmits it with high efficiency through the anti-friction bearings to the point of use. Its smooth, soft air controls permit easy, fast operation while retaining the "feel" of control for the operator.

This outstanding stripping specialist is rated at 2 to 5 cubic yards as a dragline, 3 cubic yards as a stripping shovel and 4 cubic yards as a standard shovel. Take your choice and be secure with the knowledge that your stripper comes equipped with Bucyrus-Erie mining know-how.

361F57

BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN

Bonus Quality Specifications for molding and core sands are rigidly adhered to in the production of castings. Sand compositions must meet close specifications for permeability, moisture content, compression strength, and high-temperature properties. Here, a laboratory technician uses an electronic meter to determine the PH (acid-alkaline ratio) of the sand mixture.

another reason why . . .

Leman Rebuilds Mining Machinery As Good—Or Better Than New!

With the latest auxiliary equipment, Leman's new horizontal boring machine will handle the largest existing or future mining machinery.

The latest addition to Leman Machine Co.'s repair facilities is this horizontal boring machine —permitting the finest machine tool precision on even the largest mining machinery. Now, more than ever, Leman equipment is as good or better than that of many equipment manufacturers. It will pay you to investigate the high quality repair work you get from Leman on anything from continuous mining machines to electric locomotives. Old equipment is restored to original condition—conversion to latest models is made—new parts are designed for special jobs. You'll save at Leman, where repair time is less and worn or damaged equipment is made "good-as-new."

LEMAN MACHINE CO.

Leman Repair Service Includes Speedy Pick-up and Delivery Right To The Job Site. Phone or Write for Prompt, Courteous Service That Saves Downtime On Equipment.

Box 236—Portage, Penna.—Phone 2051

NEW RESULTS OF MONSANTO RESEARCH IN USE OF AMMONIUM NITRATE AS AN EXPLOSIVE

Typical shot with Monsanto's new kind of prilled NH_4NO_3

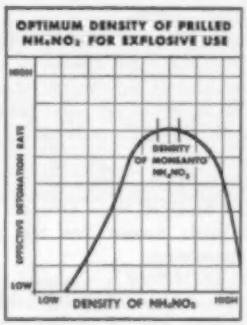
View of area involved in the blast. Shot was made in heavy columnar basalt at dam site. Used as an explosive: a new, top-quality, prilled NH_4NO_3 that Monsanto research developed to give you optimum savings, safety, speed and ease of handling.

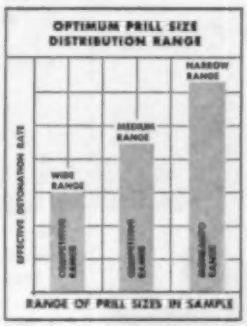
View at time of detonation. The system of detonation recommended by Monsanto, in conjunction with Monsanto Ammonium Nitrate, will yield equivalent pound-for-pound results with 60% gelatin dynamite at one-fourth the cost.

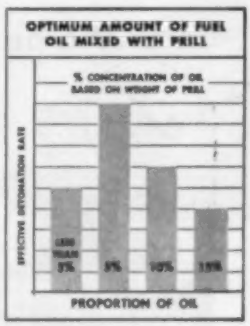
Results of blast. The powder factor in the shot above was 0.4 lbs. per cubic yard. Breakage of rock was considered ideal by contractor. Monsanto's experienced staff can give you complete technical service. Just phone Monsanto.

Photos courtesy of MORRISON-KNUDSEN COMPANY, INC.

Monsanto Ammonium Nitrate is now produced according to the specifications determined by these findings of Monsanto research. Result: more effective blast at greater savings. Monsanto is the world's largest manufacturer of prilled ammonium nitrate—and leader in developing the use of NH_4NO_3 as an explosive for open work. Request report presenting latest research findings.







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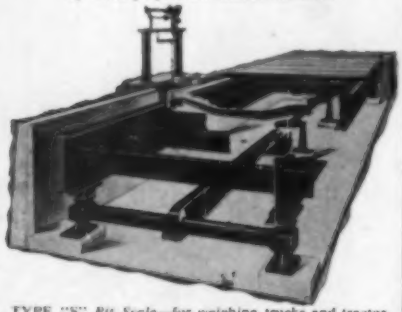

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NOW, in a fraction of present analysis time, determine

ASH and SULFUR

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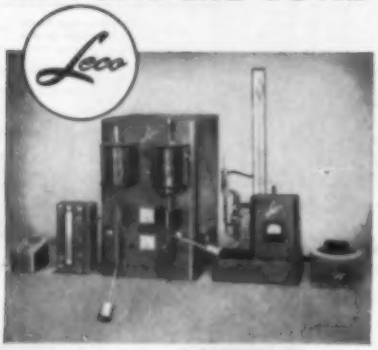

New High-Temperature Method

COAL ASHING—in 10-15 minutes compared with 1-2 hours for other methods. Coal is pyrolyzed to remove volatiles, then completely oxidized. Results are in excellent agreement with usual procedures.

SULFUR ANALYSIS—in 6 minutes compared to 1-6 hours required by Eschka procedure. Coal sample is burned at extremely high temperature. Sulfur is released as SO_2, is titrated automatically with a Leco sulfur titrator.

Write for Complete Technical Data!

LABORATORY EQUIPMENT CORPORATION

8011 Hilltop Road, St. Joseph, Michigan

Among the Manufacturers

Acquisition Announcement

Ogden Corp. said recently that they had obtained Eimco Corp. and American Foundry & Machine Co., both of Salt Lake City, Utah.

Eimco Corp., a major manufacturer of filtration and separation equipment, also produces diesel and overhead loading and excavating equipment. American Foundry and Machine turns out grey iron and steel castings, almost all of which are used by Eimco. M.L. Sindeband, executive vice president of Ogden Corp., stated that the companies would continue to function under direction of Eimco vice president, Joseph Rosenblatt. The company has plants in England, Italy and South Africa, employing about 1,800 people.

New Warehouse

In order to facilitate better service to customers, Black Mfg. Co. opened a new warehouse in Kansas City, Mo.

The house, expected to expedite shipments of the firm's electric tool products to distributors in the middle west, is easily accessible from the center of Kansas City and is close to truck and rail facilities, according to reports. Thomas Neilson is the new manager of the warehouse for Black & Decker, a large manufacturer of electric tools.

John H. Scherer was appointed vice president and director of marketing and sales for Thermoid Co.

Mr. Scherer was a member of the board of directors with Permacel Tape Co., a subsidiary of Johnson & Johnson. Recently he was general sales manager of the can division of Crown Cork & Seal Co.

American Steel & Wire Div. of U.S. Steel Co. made known two top sales executive promotions.

Maxwell D. Millard was named assistant vice president of sales, and Howard B. Maguire took over Mr. Millard's position as general manager of sales. Mr. Millard, a graduate of Princeton University and Massachusetts Institute of Technology, started with the company in 1934. He was a lieutenant commander in the U.S. Navy. Mr. Maguire joined the firm in 1919; he served overseas in World War I as a lieutenant in the Army.

Blackwell Trucking Co., Adamsville, Ala., was appointed state distributor for Davey rotary drilling machines and accessories, products of Davey Compressor Co.

The new distributor will handle the entire Davey line of six standard truck-mounted drills with rated capacities to 2,000 ft. These are available in air blast, mud pump and combination types. Davey Co. also manufactures tractor-mounted drills for extra heavy-duty service.

Jones & Laughlin Steel Corp. gave notice that Eugene F. Jannuzi would take over the newly-created post of assistant director of public relations and advertising.

A graduate of the University of Pittsburgh, Mr. Jannuzi joined J&L's advertising dept. in 1951.

W. J. Hannon has moved to the position of Chicago district sales manager for Leschen Wire Rope Div., H. K. Porter Co., Inc.

The district includes Michigan, Wisconsin, Minnesota, North Dakota, eastern Iowa, and northern Illinois and Indiana.

Everett N. Gaulding, Jr., formerly a manufacturer's representative for G-E two-way radios, has been named district sales manager for General Electric Communication Products Dept.

He will be responsible for the sale of G-E two-way radios and other communication equipment to municipal agencies, taxi, trucking and construction companies in the Iowa area. Other G-E appointments were announced: Harley F. Rolfe was nominated as district sales representative at Seattle, Wash.; L. Keith Elrod is the new district sales representative at Nashville, Tenn.

Cummins Engine Co., Inc. appointed C. J. Wilhite as manager-field service.

Affiliated with the firm since 1939, he served as northwest regional manager and assistant sales manager more recently. He will be responsible for coordinating the activities of area service managers and the export and manufacturer service managers.

U. S. Steel Corp., American Bridge Div., made two appointments. William McComb became plant manager at the division's Ambridge plant, and James A. Dunn stepped up to the general plant superintendent spot.

Mr. McComb started with U. S. Steel as a rate clerk. He gradually moved up and was instrumental in much of the development and fabrication of steel containers for long-term storage of materiel for the U. S. Army. Mr. Dunn, a graduate of Thayer Engineering School, Dartmouth College, began his service with the company in 1937 as a draftsman. Before joining U. S. Steel he served

WIRE ROPE AT WORK

Here is a drum of wire rope that obviously means business. It's a husky 1½-in. Bethlehem line, and there's approximately 6,000 ft of it. Everything about the installation points to heavy-duty service. Everything also suggests careful maintenance and good housekeeping.

The rope is one of several that Bethlehem has furnished Kaiser Steel Corp. for slope haulage work in its No. 1 and No. 2 Sunnyside Mines, Sunnyside, Utah. It's a Purple Strand rope, Bethlehem's top grade, and it never asks how tough the loads will be. A dependable workhorse, it is being counted on to handle tremendous tonnages during its lifetime at Sunnyside.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING

"Continental Conveyors have improved our coke quality"

"Our Continental coke loading boom installation at our plant at Holt, Ala. has played a big part in improving the quality of our coke," says Newton DeBardeleben, president of the "Southwide and Diversified" DeBardeleben Coal Corporation, headquarters, Birmingham, Ala. "It has materially decreased degradation and segregation of sizes in moving coke from our screening plant to railroad cars. It has been in service since 1951 without a shutdown."

In many installations in the coal field, where uninterrupted trouble-free operation is so vitally important, Continental conveyors have scored outstanding records because of their:

RUGGED RELIABILITY BALANCED DESIGN
LONG LIFE MINIMUM UPKEEP
SMOOTH PERFORMANCE
ECONOMY OF OPERATION

Continental's wide product range and engineering know-how can provide a conveying system tailored to your specialized needs. Phone or write any of our offices for complete information.

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Manufacturers *(Continued)*

with the New Hampshire Highway Dept. and U. S. Dept. of Agriculture.

George E. Goodrich joined Frank Electric Corp., York, Pa., manufacturers of special controls for industry, as vice president in charge of sales.

Mr. Goodrich came to this position from that of industrial sales manager of Atlantic Apparatus Div. of Westinghouse Electric Corp. His headquarters will be in Bala-Cynwyd, Pa.

New additions to Foote Mineral Co.'s research and development staff have been announced.

Dr. David W. Mitchell, formerly associate professor of metallurgy at the University of California, is at the firm's Kings Mountain laboratories. Dr. Justo B. Bravo and Dr. Meyer M. Markowitz have come to the Chemical Research Div. as senior research chemist and project leader, respectively.

Acme-Hamilton Mfg. Corp. made known the appointment of Henry C. Heine as sales manager of its Hamilton Rubber Mfg. Corp. Div.

Mr. Heine, with 18 yr of experience in the rubber industry behind him, will direct sales of Hamilton industrial products. He was formerly associated with Hewitt Rubber Corp. and Quaker Rubber Corp.

Brunner & Lay, Inc. has chosen Wayne Burnside as sales manager.

Mr. Burnside was formerly sales manager of Brunner & Lay Rock Bit of Philadelphia and comes to his new job with extensive background in sales and service of pneumatic accessory tools and carbide drill bits.

Cardox Corp., Mining Div., selected Paul C. Manley as sales manager and William R. Hennessey as assistant sales manager, with headquarters in Chicago.

Mr. Manley, 23 yr with Cardox, was formerly western division sales manager; Mr. Hennessey, who came to the firm in 1948, was district manager for Indiana and western Kentucky. Cardox Corp. manufactures mining equipment and drilling rigs.

Robert L. Swank was named manager of sales—plastic pipe, for National Tube Div., U.S. Steel Corp.

Mr. Swank, with U. S. Steel since 1946, will be in charge of the nationwide sales of plastic pipe, and will make his headquarters in Philadelphia. At the same time, Thomas D. Cramer, formerly with the firm's commercial research dept., was appointed assistant manager of sales—plastic pipe, for the same U. S. Steel division.

This Bucyrus-Erie 190-B long range shovel keeps a fleet of hauling units on the go at a large mine in western Kentucky.

In Kentucky . . . and the World Over

BUCYRUS-ERIE ELECTRIC SHOVELS HELP KEEP HAUL UNITS ON THE GO!

Dependability is a big reason why Bucyrus-Erie electric shovels keep haul units on the go. Their heavy-duty construction enables them to take over the tough work . . . and keep working day after day, year after year. The exclusive two-section boom, tubular dipper handle and twin dual hoist combine to provide great strength, while reducing power-consuming deadweight. Strain on main machinery is reduced . . . work cycles speeded.

And Bucyrus-Erie electric shovels are as productive as they are dependable. Ward Leonard control provides fast acceleration and deceleration for high speed coordinated operation, assures extra torque when it's needed for maximum output. Let us tell you more about the proven dependability and big output of Bucyrus-Erie electric shovels. Write for full information. 134L57

Bucyrus-Erie Company

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If you convey this . . .

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QUAKER CONVEYOR BELTING FOR SAFETY AND STAMINA!

Quaker Rubber's fire-resistant, flame-retarding belt actually *exceeds* the U. S. Bureau of Mines essential standards for underground mine safety.

The specified flame test permits burning up to 1 minute. But when the test is made on Quaker's belt, the flame is extinguished *instantly*. What's more, afterglow disappears in about one-third the time required by Bureau standards.

This belt is also lightweight and highly flexible. It has good troughability, yet is tough enough to take shock impacts and heavy, jagged loads. Made in any length. Widths up to 72".

Next time, specify "Fire Resistant U.S.B.M. 28-11" from your Quaker Rubber or Quaker Pioneer Rubber distributor. You'll like the savings . . . and the service.

For more information, write to:
H. K. Porter Company, Inc., Quaker Rubber Division, Philadelphia 24, Pennsylvania, or Quaker Pioneer Rubber Division, Pittsburg, California.

H. K. PORTER COMPANY, INC.
QUAKER RUBBER DIVISION

Manufacturers *(Continued)*

George A. Waterman has joined Olin Mathieson Chemical Corp. as director of product sales and engineering for Olin Aluminum Div.

He had been manager, extrusion sales, for Kaiser Aluminum & Chemical Sales, Inc. Mr. Waterman, a graduate of Michigan University, has served in various technical and sales capacities with Revere Copper and Brass, Inc.

Thomas E. Turner has been chosen for sales representative of Leschen Wire Rope Div., H. K. Porter Co., Inc.

His territory will include Virginia, West Virginia and North Carolina. Mr. Turner, a resident of Virginia, was formerly a sales representative for Esso Standard Oil Co., covering the state of Virginia.

Edwin Hodge was elected chairman of the board for Westinghouse Air Brake Co.

Mr. Hodge, director of the National Supply Co., Blaw-Knox Co., and a number of other firms, has been a director of Westinghouse Air Brake Co. since November, 1949, and was made chairman of the executive committee in April, 1955.

Frank W. Jenks, formerly executive vice president, International Harvester Co., was elected president of the firm, succeeding Peter V. Moulder, who retired from the position.

Mr. Jenks, a native of Richmond, Va., began his career with the company in 1914. After serving with the Army in the first world war, he returned to International Harvester as a sales manager and rose through successive positions of responsibility.

Bituminous Output

YEAR TO DATE	PRODUCTION
October 19, 1957	396,591,000
October 20, 1956	399,665,000

1957 output 0.8% behind 1956.

A month earlier output was 0.3% behind 1956.

WEEK ENDING	PRODUCTION
October 19, 1957	9,890,000
October 20, 1956	10,534,000

Anthracite Output

YEAR TO DATE	PRODUCTION
October 19, 1957	20,859,000
October 20, 1956	22,999,000

1957 output 9.3% behind 1956.

A month earlier 1957 was 5.9% behind 1956.

WEEK ENDING	PRODUCTION
October 19, 1957	504,000
October 20, 1956	700,000

Joint Fuels *(Continued)*

power and other industrial uses.

However, Mr. Frith noted, before the Seaway is completed, natural gas will be available in the Montreal area, and there cannot be much doubt that it will replace a considerable amount of solid fuel. It would not be surprising if U. S. coal moving east (through St. Lawrence canals mainly to Cornwall, Montreal, Three Rivers, Quebec and Port Alfred) dropped from 1,750,000 tons in 1956 to somewhere around 1,000,000 tons in 1959 or 1960, despite a cheaper delivered price.

From 1959 on, a steady increase in coal use should accompany the industrial growth due on both the U. S. and Canadian shores of the St. Lawrence. To the extent that this growth takes place west of Montreal, it will presumably be serviced mainly by self-unloading boats. These will be the large type now operating on the upper Lakes and will carry cargoes of 8,000 to 14,000 tons. In this movement, the loading ports on Lake Ontario will have to be improved if they wish to maintain their share of the business. The loading docks on Lake Erie are, of course, able to handle any of the big self-unloaders.

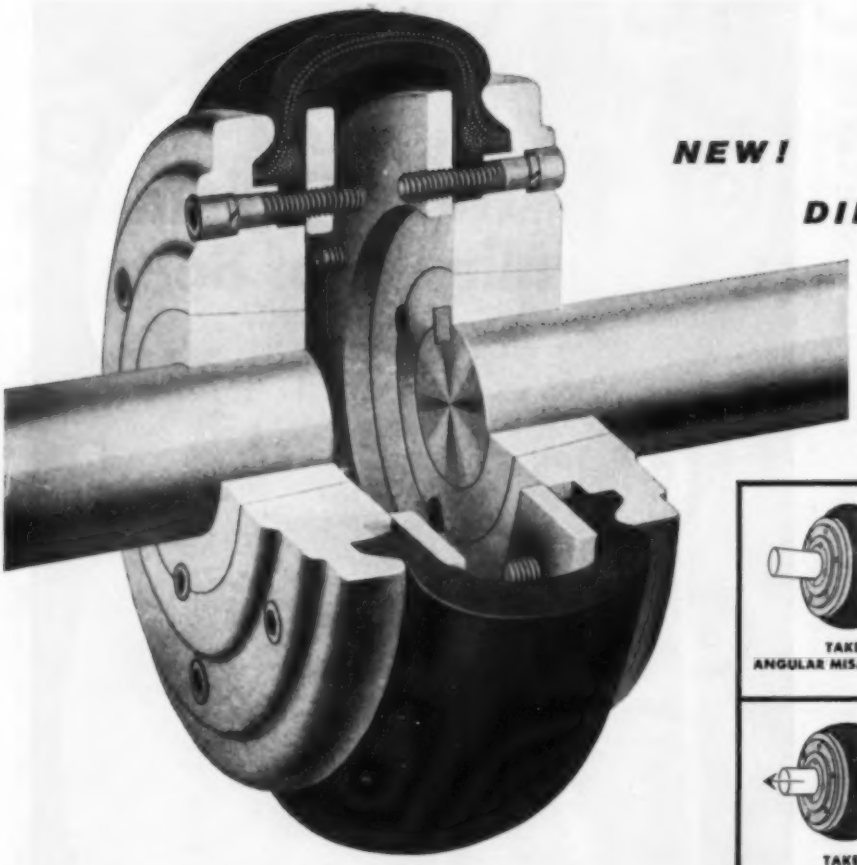
There may also be an excellent chance of at least some export coal moving to Europe via the Seaway. This, in the long run, will depend on the economies involved and also to a large extent on the availability of ocean vessels in the Great Lakes. If, for example, vessels capable of carrying bulk cargoes to Europe find themselves light in the Great Lakes, it is obvious they would prefer to load cargoes there rather than to take the time to go all the way down to east coast ports.

Another possibility is that of establishing a transfer dock east of Montreal. If this had merit, lake boats on their way down for ore could carry coal to the transfer dock where it could in turn be reloaded into ocean vessels. Such an arrangement would shorten the ocean trip to Europe by 500 to 800 mi, and if the canal tolls and the transfer charges were not too high, it is possible that considerable tonnage could be developed via this route. Transfer facilities could also be used to "top off" boats which were loaded light in the Lakes due to draft restrictions.

Coal Use by Canadian Industry

Canada's combined industrial consumption of coal, oil and gas increased from 15,383,079 coal-equivalent tons in 1948 to 21,440,069 tons in 1955. However, oil and gas use by industry moved up more rapidly. As a result, coal supplied 54.9% of the total industrial fuel in 1955, compared to 74.9% in 1948. As far as can be seen now, Mr. McL. Hutt

Fast and
Easy
West Virginia
Mine Roof Bolts
Preassembled mine roof bolts, quality produced and carefully assembled by the West Virginia Works, Connors Steel Division, H. K. Porter Company, Inc., at Huntington, West Virginia are fast and safe . . . save time and labor on the job.
Specify West Virginia Mine Roof Bolts . . . the efficient way to hold up the roof . . . not production.
For Free Field Engineering Service and personalized attention to your needs, contact West Virginia Works, P. O. Box 110, Huntington, West Virginia.
H. K. PORTER COMPANY, INC.
CONNORS STEEL DIVISION



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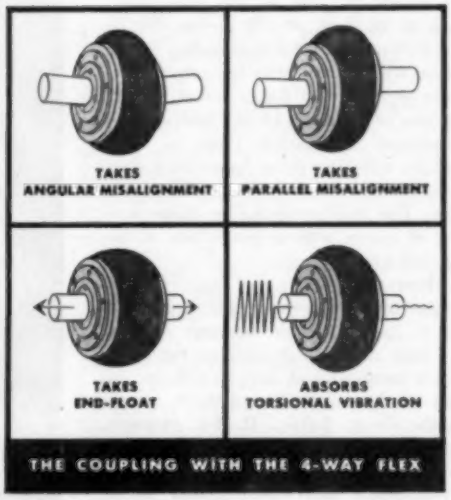

Announcing

Para•flex

FLEXIBLE CUSHION COUPLING

THIS coupling "swallows up" shaft misplacements. It automatically compensates for end-float, parallel misalignment, angular misalignment or *any combination of all three.* Moreover, it cushions the stresses of shock loads. And it absorbs torsional vibration—reducing noise and protecting machinery from vibration's destructive forces.

Here is a new type of performance—made possible by the development of a tire-like flexing element. Synthetic tension members, bonded together in rubber, give this element the stamina and dependability of modern, high-speed, high-load, shock-absorbing truck tires—and the ability to respond magically to all manner of changing shaft conditions.

Para-flex takes minimum space on the shaft. Mounting is simplified through the use of standard Taper-Lock bushings—no reboring, no machining. Safety is promoted by flush design; there are no protruding parts. No lubrication is required, no periodic inspection. And since the flexible member is molded with a transverse split, it can be replaced *without moving either the driver or driven machine.*

Para-flex Couplings are stocked by Dodge Distributors in popular transmission sizes. They are available from factory stock in capacities up to 600 hp at 900 rpm. Call your distributor for early delivery to *make your own test.* You'll witness something revolutionary!

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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new methods. Look for his name under "Power Transmission Machinery" in the yellow pages of your classified telephone directory—or write us.

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Without this excellent book, your technical library isn't complete. If you haven't already received your free copy, by all means send for it now.

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U N I T E D S T A T E S S T E E L

Joint Fuels (*Continued*)

says, this trend is likely to continue.

Much of the relative decline in coal use between 1948 and 1955 was due to the railway market which was more than halved. This decline will continue until dieselization has been completed.

Coal consumption by the coke and gas industry has remained steady and there is a possibility that it will move forward.

Wood products and mining used slightly more coal in 1955 than in 1948. During the same period, the animal and vegetable products industry and the iron and steel industry consumed less coal, even though activity in both of these fields has increased.

Each of the principal coal consuming industrial groups, with the exception of power, is several times larger in Ontario and Quebec than in all other provinces combined. In that region, the consumption of industrial coal has remained steady at about 75%. These provinces provide almost the entire industrial market for U. S. coal. Worth noting, however: In the 8 yr period ending in 1955, imported industrial coal used other than by railways and the coke and gas industry in Quebec and Ontario fell from 66.9% to 56%. Canadian coal actually gained in this field on a tonnage basis.

Some Canadian areas are now faced with a shortage of undeveloped hydroelectric sites, and in these areas coal will become important as a power source. This applies now in New Brunswick, Ontario and Manitoba, and always has in Saskatchewan. It is unlikely that gas or oil will successfully compete with coal in Central Canada, though they might in the West.

In other industries gas and oil may replace coal in many areas, but Canadian coal will tend to hold its own across the country, and even to improve its position in some fields with increased industrial activity.

Coal Selection in Central Canada

The selection of coal for a given plant in Central Canada not only requires a technical knowledge of coal analysis, properties and performance characteristics, but also a complete knowledge of coal sources, transportation and handling systems.

In writing initial fuel specifications, Mr. Cooper stated, coal selection must include an evaluation of these factors:

1. Dust and air pollution—loading of collectors.
2. Fly ash disposal—cost and difficulty.
3. Coal and ash handling—capacity and physical limits.
4. Size application—breakage, crushing, segregation.
5. Corrosion of heating surfaces.
6. Slagging and clinkering.
7. Load variations and steaming capacity.

Coal evaluation should also consider design limits to provide optimum values in combustion rates and heat releases. All too often limits are exceeded to meet capacity demands and, if operation history indicates such experience, economics must be put in a secondary position and the coal selection field narrowed accordingly.

Because of the many handling and processing operations involved in moving Lake coal from mine to consumer, Mr. Cooper stressed that several restrictions on coal usage are imposed which the average person does not consider in his application. Friability and size stability are important factors in making it possible to deliver the coal size requirement for a given application. Coal porosity is also important because it affects the amount of moisture pickup and retention from the various weather conditions occurring during the coal storage period. Moisture absorption and retention characteristics also are affected appreciably by the size of coal selected.

Coal selection is further limited by

For heavy hauling you'll do better with JEFFREY 8-wheel Trolley Locomotives

Big coal loads can be hauled fast with Jeffrey 27, 37 or 50-ton single-unit locomotives.

Operation and maintenance are better, too. The four-wheel, equalized double trucks and the short overhang at the ends give an easy ride at high speed. The eight wheels distribute the locomotive's weight for less concentrated rail loading.

Outstanding operating and safety features include: roller-bearing type journal boxes and motor axle suspensions... air and dynamic service brakes... automatic couplers with air-operated uncoupling . . . trolley with air-operated retriever...separate blower for each motor.

Other features of 8-wheel locomotives and other types for mainline and secondary haulage are described in Catalog 836. For a copy, write to The Jeffrey Manufacturing Company, Columbus 16, Ohio.

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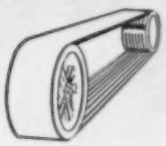
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

USE RIP and FIRE-RESISTANT
RAY-MAN CONVEYOR BELT...
"More Use per Dollar"

Special cushioned and rip-resisting strength members with *double* compensation to relieve stress on outer plies, give Ray-Man Conveyor Belt unusual flexibility. Ray-Man trains *naturally*, troughs *easily* . . . permits fuller loads of coal even where relatively thick, narrow belts are used . . . or where pulleys are small in low head-room installations. No breaker ply is required for Ray-Man, because it's specially constructed to resist gouging and tearing, and *hold* fasteners—under the most severe conditions. Like all Manhattan heavy duty conveyor belts, Ray-Man is moisture, mildew-proof . . . protected against wear, tear, cuts and abrasion by R/M's exclusive "XDC" Cover. And, like all R/M *underground* belts for coal mining, it's now available in special fire resistant construction with Bureau of Mines' acceptance designation: "Fire Resistant, U.S.B.M. No. 28-10." Fire Resistant Ray-Man Conveyor Belt cuts handling costs because it does a better, *safer* job . . . and lasts longer!

Let an R/M representative show you advantages in other R/M feature conveyor belts, too . . . extra-cushioned Homocord, for abusive shock loading . . . R/M Tension-Master for extra long slope lifts and high tensions. There's an R/M heavy duty conveyor belt to give you "More Use per Dollar" on *every* job! Write for descriptive bulletins.

More Dependable Mine Drives with R/M *Poly-V*®



This patented new concept in heavy duty drive transmission delivers up to 50% *more* power in the *same* space as ordinary V-belts . . . *equal* power in *less* space! It employs a *single*, V-ribbed belt . . . eliminates "matching" problems . . . cuts belt and sheave inventories to a new low! Write for a copy of Poly-V* Drive Bulletin #6638 *today!*

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Companions in Coal Production

While a Marion 7800 walking dragline (background) strips overburden, its companion, a Marion 4161 shovel, loads coal at a vast bituminous stripping operation in southern Indiana. Overburden of clay and shale measures 40 to 85 feet in depth, and the coal seam averages six feet in depth. Swinging a 35-yard bucket on a 195-foot boom, the big walker moves an average of 550,000 yards per month. The electrically-powered loading shovel has a 7½-yard dipper.

The smaller Marions handle big tonnages, too! At a Canadian ilmenite smelter, this 111-M clamshell uses a 3-yard bucket for ore and a 6-yard bucket for coal.

CONSULT MARION MINING SPECIALISTS *for lowest costs on your property!*

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Joint Fuels *(Continued)*

the size of mine and its ability to ship cargo quantities of the type and size of coal ordered promptly. It follows that the larger the mine the greater the versatility in meeting cargo loading deadlines or in loading larger vessels which provide the lowest rates.

Thermal Power Outlook

In fuel deficient Central Canada, imported American coal would seem to be in the best position to provide the cheapest thermal power until nuclear fuel proves a cheaper source of energy, Mr. C. E. Baltzer declared in the final paper of the Thursday morning session. Here, tremendous growth is forecast for Ontario's main utility. By 1980, for example, the requirement in dependable peak capacity has been estimated at five times today's capacity. Not more than 25% of this capacity is likely to come from hydro-electric sources. And only time will tell how much of the remaining 75% will be divided between coal-fired and nuclear-fueled capacity.

However, within the next 5 yr, developments underway in conventional steam stations will create coal demand several times greater than the one-half million tons a year currently used. Coal imported from the Appalachian area of the U. S. is expected to supply this demand.

Most progress in the use of thermally generated power is developing in three main regions, namely, the Maritimes, southern Ontario, and the Prairie Provinces. In these regions, power demands within the next 25 yr should far surpass the supply of additional, economically available hydraulic energy. Therefore, thermal power will be called upon to play an increasingly important role in the Canadian power picture.

Because of the location of existing fuel supplies, development will likely follow some fairly definable pattern. In Western Canada, where coal, oil and gas reserves are most abundant, these fuels will likely continue to share the market and give the cheapest and most dependable thermal power. However, in Western Canada the trend is toward the low-rank, strip-mined coals and lignite of the prairie region which, on a cost basis, have a decided advantage over the high-rank, more costly, deep-mined coals of the foothill and mountain regions of Alberta and British Columbia.

In Eastern Canada, where highest fuel costs presently apply, indigenous coal and imported oil have become increasingly competitive, and either one or the other, depending on circumstances, will produce the cheapest thermal power until nuclear fuel gains the hoped-for-advantage at some future date. Throughout the Maritime area, oil so far has only gained foothold to a limited extend at seaboard points with harbor facilities capable of serving ocean tankers. The bulk of the energy for central station use is still provided by coal produced in Nova Scotia and New Brunswick. Since coal reserves of the latter province are relatively small, and its power needs are rising steeply, Nova Scotia coal must obviously be depended upon for any expanded future requirements.

Co-chairmen for the Thursday afternoon session were G. L. Judy, vice president, Consolidation Coal Co. and J. B. Morrow, coal consultant. The session included these talks:

Evolution and Growth of Continuous Coal Mining Systems, Paul R. Paulick, consulting mine engineer, Bethel Park, Pa.

Dust Control for Mechanized Underground Mining Operations, Donald Weibe, manager, Joy Mfg. Co. Experiment Station, Saltsberg, Pa.

Flow of Coal in Bins, F. D. Cooper, project engineer and J. R. Garvey, assistant director of research, Bituminous Coal Research, Inc.

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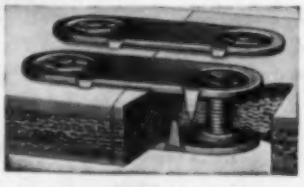

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Joint Fuels *(Continued)*

Role of Continuous Mining

Continuous miners are contributing in a big way to keeping the U. S. coal industry competitive with other forms of energy, Mr. Paulick told the joint U. S. and Canadian fuels group.

Since the introduction of continuous miners, industry-wide worker productivity has nearly doubled. Output per man day in 1948 was 6.26 tons; in 1956, it reached 10.79 tons; in 1957, it is expected to exceed 11 tons.

Largely as a result of increased worker productivity, the price of coal has remained relatively stable even though miner wages have increased sharply.

The coal industry now feels confident that it won't be long until its competitive position is stabilized to the point where coal will hold its own and even replace gas and oil, especially in the power producing industry.

Mr. Cooper's talk included a slide-film presentation illustrating the evolution and growth of continuous coal-mining systems.

Dust Control Equipment

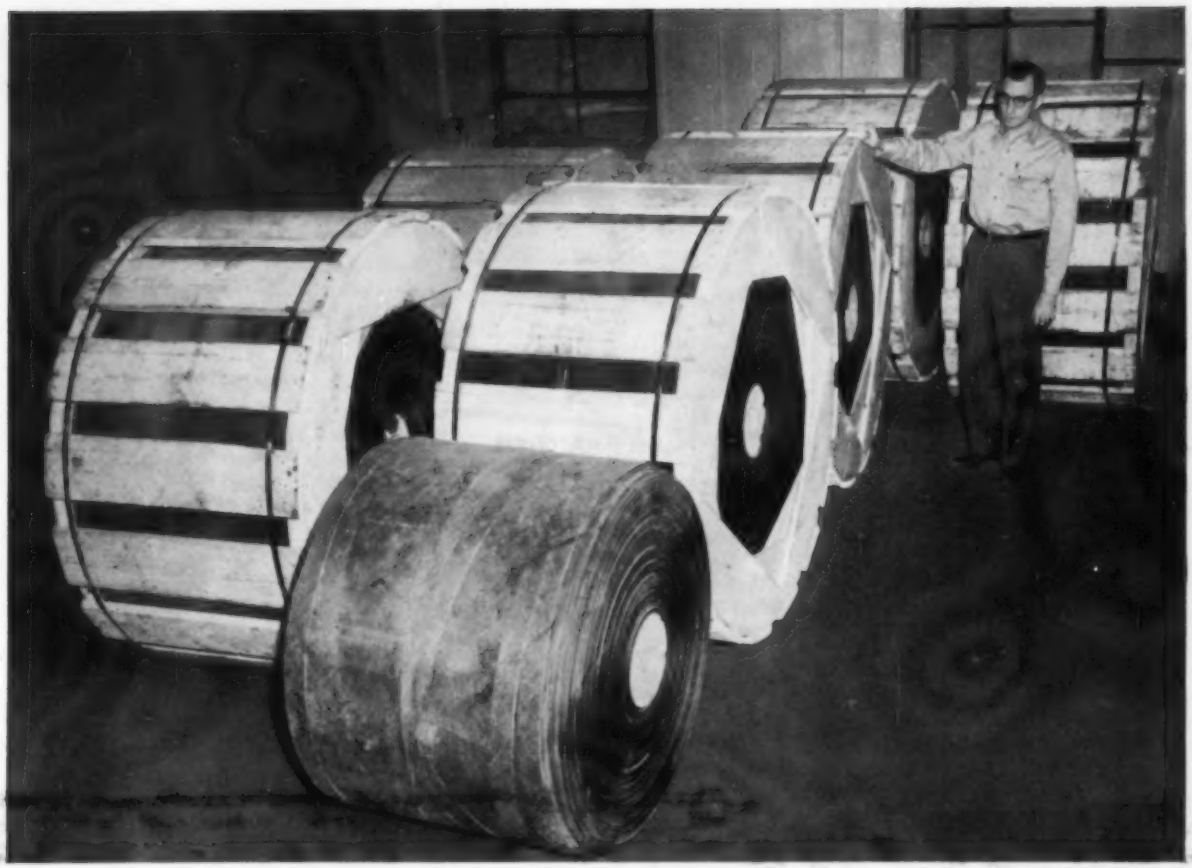
Mr. Weibe outlined the experience of Joy Mfg. Co. in promoting progress toward solution of some underground dust problems. In particular, he spoke of the Joy Microdyne which has been under development for the past 5 yr. The machine was described as "a completely new wet collecting device utilizing the principle of high velocity, impingement and diffusion, as well as water separation."

In conjunction with series 1000 Axivane Fans, the Joy Microdyne provides a dust collector-fan combination that fits readily into any duct system. The system is approximately duct size in capacities ranging from 500 to 64,000 cfm with collector diameters from 8 in to 60 in, respectively.

The collector-fan diameter is in the order of 28-in, but with the structure required for suspending other components, including permissible DC controls for the 30 hp fan on a portable chassis with four-wheel steer, the resulting width across the wheels is 44 in. The unit is 48 in high and 13 ft long.

The future of the Joy Microdyne as an underground collector, applied to mechanical coal mining, has yet to be determined. Further tests of the unit are contemplated in other mines and under different conditions to determine its acceptability to operating mine personnel, as well as to state and federal mines authorities.

"We recognize that a compact mobile unit, such as we have now in the Joy Microdyne, will still require considerable testing, demonstration and study before



3900 feet of 30-inch neoprene conveyor belting ready for service in Lady Dunn Mine.

Why Cannelton chose neoprene conveyor belting

The 3900 feet of neoprene belting shown here is now in service at Cannelton Coal and Coke Company's Lady Dunn Mine at Cannelton, W. Va. The Company plans to use neoprene belting exclusively for future conveyor service because it is flame resistant, oil and grease resistant and easy to vulcanize . . . and neoprene offers long life.

Neoprene covers have excellent resistance to abrasion, cutting and chipping, which gives long-term protection of the body fabric from deterioration by mildew, acid mine water, load abrasion. Neoprene's resistance to aging and softening by contact with oil is further insurance of long belt life. When used on the surface, neoprene's resistance to sunlight and weathering is an important advantage. All of these properties mean long-term economy in any mine.

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Joint Fuels *(Continued)*

it can meet the many special requirements unique to mechanical coal mining. From the limited experience with exhausting systems for continuous mining face applications in the industry thus far, there are many indications that this approach might hold a possible answer."

Flow of Coal in Bins

The results of BCR studies on the flow of coal in industrial-size combination cylindrical- and conical-bottom bins were presented by F. D. Cooper. He also described the design and construction of a BCR-patented flow-control device which incorporates these results.

In making the studies and developing the device, Mr. Cooper said it was assumed that many of the problems met in the field were directly connected to the presence of a ¼x0 in coal in the size mixtures being stored, and that a test bin sufficiently large to minimize the effect of the coal-scale factor with this coal size would produce valuable information.

From the nearly 150 tests run, it was concluded that poor flow performance of conventional storage bins is due to the presence of a central core movement responsible for ratholes and high pressures on and coal adhesion to the hopper walls. And, Mr. Cooper added:

"The solution to reliable solids flow is a cheap means to eliminate the central core and to provide an environment of low, steady pressures on the hopper walls, thereby obtaining plug-type motion through the entire bin and hopper."

Mr. Cooper cautioned that the BCR coal-flow device was an appendage for adding to the bottom of a conventional-type bin. If the device were scaled up to large industrial-bin size, the conical interior construction would occupy so much storage volume that its use would be impractical.

Also noted: The work on other than cylindrical bins is still in exploratory stages. But results of cylindrical bin research are expected to prove beneficial in the handling of fine wet coal by utilities and in carbonization plants.

Eighth Seaway

Opening the Friday morning session, E. V. Tidman, engineer, Hewitt Equipment Ltd., presented a most interesting colored movie film on the work, progress and plans of the St. Lawrence Seaway and Power Project. Under co-chairmen, W. Reid and J. M. Pilcher, Battelle Institute, the session continued with the following papers:

Pelletizing of Fine Coals, Martial P. Corriveau, preparation engineer, Clinchfield Coal Co., and Thomas Linton, engineer, Link Belt Co.

Thermal Stabilization of Anthracite by Calcination, J. W. Eckerd and R. F. Tenney, USBM, Schuylkill Haven, Pa.

Problems in Freezeproofing North Dakota Lignite, R. C. Ellman and J. W. Belter, USBM, Grand Forks, N. D.

Pelletizing Fine Coals

With the increasing enforcement of stream and air pollution laws and decreasing storage facilities for fines, it has become quite clear that more satisfactory and permanent methods for the disposition of coal fines must be adopted.

Mr. Corriveau and Mr. Linton proposed the pelletizing of coal fines as a possible solution. The pellets produced—because of their attractive physical properties, strength, freedom from dust, and low moisture content—can command a premium over what is obtained by present methods of fines disposal.

The process involves mixing the moist fines and dry recycle with a small quantity of a binder in a paddle mixer. During the mixing, aggregates are formed which are introduced to a Roto-Louvre dryer for further agglomerization and for drying to about 2% surface moisture. The binder used is a by-product from the sulfite process for wood pulping. An important factor contributing to the eco-

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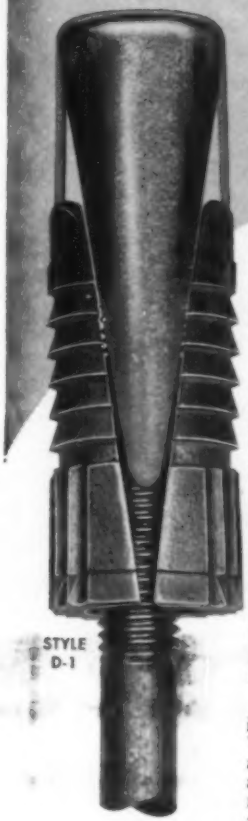

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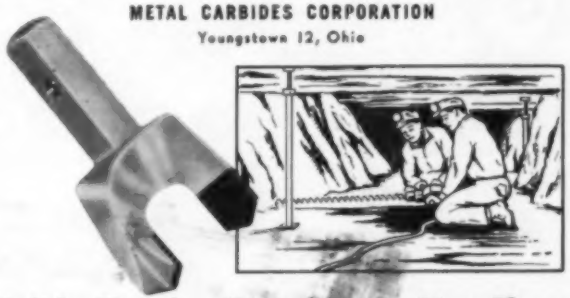

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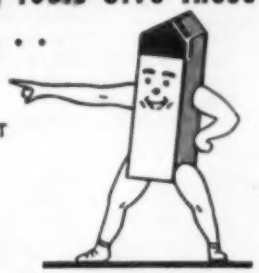

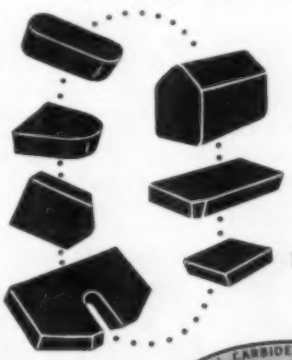

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Joint Fuels *(Continued)*

nomic attractiveness of the process is the use of basic units throughout.

Stabilizing Anthracite

J. W. Eckerd presented results of USBM tests on the thermal stabilization of anthracite by calcination. Lack of resistance to thermal decrepitation has been a serious obstacle to use of anthracite in modern metallurgical equipment.

Mr. Eckerd and co-author, R. F. Tenney, summarize: "These tests, although not considered conclusive, do indicate that at least under certain foundry conditions, calcined anthracite can be used as a cupola fuel. Research is being conducted at present to define further the limitations of the use of this material in metallurgical processes."

Freezeproofing Lignite

Progress has been made in laboratory studies aimed at solving problems in freezeproofing North Dakota lignite, R. C. Ellman stated. In particular, progress involves the development of a promising laboratory method for measuring the degree of agglomeration. By this method, the factors that influence agglomeration by freezing and ways of reducing or eliminating it may be compared.

Tests to date indicate that oil treatment in use by the industry reduces the degree of agglomeration of lignite. Considering the mechanism by which lignite agglomerates and the effect of oil treatment on frost formation and structure, other agents or methods may be found by which the difficulties may be reduced or controlled still further.

In the final session Friday afternoon, the following papers were presented:

Use Value of Competitive Fuels, Veleair C. Smith, chairman of the board, Management Group Companies, Charleston, W. Va.

Sound Methods of Solid Fuel Evaluation for Use in Thermal Power Stations, E. D. Holdup, superintendent, Richard L. Hearn Generating Station, Hydro-Electric Power Commission of Ontario.

The Use of Gravity Methods for Cleaning the Extreme Fine Sizes of Bituminous Coal, D. R. Mitchell, chairman, Div. of Mineral Engineering, and H. B. Charmbury, head, Dept. of Mineral Preparation, Pennsylvania State University.

Co-chairmen of the session were: E. F. Osborn, dean, College of Mineral Industries, Pennsylvania State University and T. R. Scollon, USBM.

Competitive Fuels

The present era of intense and fierce competition between fuels can be understood best in terms of their respective "use values," Veleair C. Smith pointed out. Use value represents a number of

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Unique assembly (patent applied for) contributes towards non-blinding, non-clogging performance. The Migh-Tee Kleenslot is also adaptable to vibrator applications and can easily be interchanged with other types of Kleenslot Screens without mechanical changes.

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A No. 12 helps haul roads recover fast from heavy spring rains

Haul roads at Big Horn Coal Company's mine near Sheridan, Wyo., are firm and passable despite heavy spring rains. A Caterpillar No. 12 Motor Grader teams up with a D8 Tractor-Scraper combination to keep them that way. The big No. 12 works shale—hauled by the tractor—into soft spots which could easily disrupt the 370,000-ton-per-year production at the mine.

But Big Horn, a subsidiary of Peter Kiewit Sons' Company, has year-around jobs for this versatile CAT* machine. It not only maintains haul roads, but it builds new ones. It cleans the surface of the coal seams. And it continually grades loose coal into windrows to be picked up by the tractor-scraper.

The production of this big motor grader is as important as its all-around usefulness. Today the No. 12 packs more power than ever—115 HP—and has faster reverse speeds. An exclusive Caterpillar oil clutch gives you more efficiency and economy. Maintenance is reduced and no external lubrication is required. In addition, tubeless tires are standard equipment *at no extra cost.*

Each of these design advances assures you of still greater productivity, lower costs and longer work life. For complete information on all three sizes of Cat Motor Graders, see your Caterpillar Dealer—your source of efficient service and parts you can trust. Ask him to show you the facts and figures proving how these motor graders can step up your production and cut your costs. Better still—name the date! He'll be glad to demonstrate any of these machines on *your* job . . . at *your* convenience.

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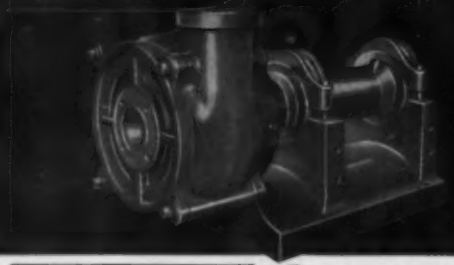
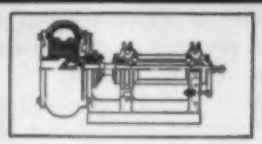
2. **If you are interested in additional sources of equipment, materials and services . . .**
3. **If you are developing a new idea in production, preparation and safety and want to see what's available for carrying it out . . .**

Check the Buying Directory beginning on p 289. Find the product in the alphabetical list. Under it will appear the names of the key manufacturers, with those advertising in this issue indicated by **black-faced** type.

Consult the manufacturers' advertisements in this issue for information on specific products, materials and services. To locate the local source of supply nearest you, check the list of advertisers district sales offices and distributors provided at the end of this issue.

LINATEX®
CENTRIFUGAL
PUMPS





LINATEX LASTS LONGEST
Sizes from 1" thru 12".

CURRENT USES INCLUDE:
Corundum slurry (at 40% solids) Corrosive, refinery solutions ores-copper-iron-phosphate-feldspar-garnet, also gravel, coal, glass sand.

Technical Bulletin on request

LINATEX CORPORATION OF AMERICA
ROCKVILLE, CONNECTICUT

In most mining companies, all key officials read Coal Age because it helps them do a better job

If you're not a regular subscriber, Mail this coupon TODAY

COAL AGE, Subscription Manager,
330 West 42nd St., New York 36, N. Y.

Send me COAL AGE for 1 year at $3 (U.S. and Canada only).

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Name _____ Position _____

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City _____ Zone _____ State _____

Mining Company _____

Hdqs. or Mine Name _____

To Save Delay, Please Fill Out Completely

61157

When your problems call for the last word on underground mining

Check Your Coal Age Guidebook *First*

Packed between the covers of the annual Mid-July Mining Guidebook is a 247-page practical working manual covering all phases of mine operation—the only complete, single-volume reference guide to present-day mining methods and equipment available anywhere.

The 81-page Deep-Mining Guidebook—just one of the seven editorial sections—offers you a fast-reading analysis of efficient mining practice, tied in with operating experience and results gathered from hundreds of successful mines and highlights of the new and significant trends important to you. Other sections brief you on auxiliary services, such as preparation, maintenance, supply handling and safety. You'll find the entire Guidebook a thoroughly indexed, easy-to-use reference tool to help you develop new ideas and a fresh slant on operating problems.

For speedy reference to equipment, materials or services meeting your particular needs, turn to the 63-page Buying Directory listing all known manufacturers of over 1,100 products used in coal mining. Completely revised and up-dated for the 1957 issue, this comprehensive guide is supplemented by detailed product information in manufacturers' advertising and the location of your nearest source of supply in the list of sales offices and distributors.

DEEP MINING • STRIPPING • PREPARATION • MAINTENANCE • SUPPLIES • SAFETY • TRAINING • OPERATION STANDARDS • BUYING DIRECTORY

An Annual Coal Age Subscriber Service— Used Daily by Progressive Mine Management

The SIMPLE LOW COST WAY to RECOVER COARSE COAL FINES

with

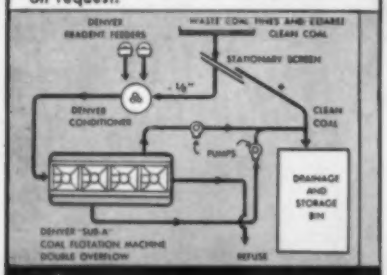
DENVER "Sub-A" COAL FLOTATION

HANDLES 1/8" FEED

With Denver "Sub-A" Flotation machines you can handle 1/8" feed. Ability to float coarse fines eliminates costly intermediate treatment steps, aids fine coal dewatering and water reclamation, simplifies construction of fine coal recovery systems.

Although coal particles as coarse as 1/8" may not always be completely recovered by the flotation process (which is most effective with minus 28 mesh coal), you will recognize the advantage in simplification provided by handling all of the undersize from coal cleaning and recovering all floatable coal in one low in ash product.

Over 95% of all coal flotation plants in the U. S. use Denver "Sub-A". Why not follow their lead? Case histories on request.



DENVER EQUIPMENT CO.

1400 Seventeenth St. Denver 17, Colorado

Joint Fuels *(Continued)*

continually varying factors translated into the cost of the end product. These include production, beneficiation, transportation, availability, handling and amortization of capital costs.

Coal people think too much in terms of thermal value and low f.o.b. mine cost, and not enough in terms of all use value factors involved in converting fuels to useful energy.

Dump gas, Mr. Smith claimed, was competitive in the sense that it represents "inventory"—a factor in the use value concept. Producers sell this inventory to write off their investment in production, pipeline and storage facilities.

Evaluating Coals

Mr. Holdup gave a detailed picture of how solid fuels may be compared and evaluated for use in thermal power stations.

Just as coal is one of nature's most complex minerals, and no two coals are identical, similarly there is no 100% foolproof method of evaluation. The cheapest is not necessarily the best; operating conditions are very important and experience is the great teacher.

The final selection will be on the most economic overall cost of fuel on a basis of energy rather than weight, and allowing for cost of ash disposal and also corrected by operation experience (e.g., variation in boiler efficiency due to different grades of coal).

In the future, further limitations may be placed on discharge of noxious gases and dust from power-station stacks, which might restrict further the range of solid fuels that could be used.

Gravity Fines Cleaning

Present clean stream legislation makes it necessary to remove solids from wash water and, if economically possible, to recover the associated coal as a saleable product. However existing gravity recovery methods are either costly, or not applicable in all situations.

Mr. Charmbury drew attention to current research work. He said the possibility of using high pressure cyclones as concentrators for cleaning Dorr thickener underflow has been under investigation in the mineral dressing laboratories of the Pennsylvania State University for some time. The results have been encouraging and at least one plant installation has been made and is now operating for cleaning Dorr thickener underflow.

In addition, a gravity method of separation has been developed in the laboratory utilizing stream flow action, on an especially designed traveling belt machine. These two units, cyclones and gravity belt separators, have shown themselves to be effective in removing sulphur from Dorr thickener underflows, making it possible to make a low sulfur product suitable for blending with other products of the preparation plant. This is particularly important to those plants preparing coal for metallurgical purposes.

Earnings Reported

Island Creek Coal Co. and subsidiaries reports net sales, operating revenues, rentals and royalties for the nine months ended Sept. 30, of 90,620,081, compared with $85,059,687 for the corresponding quarters in 1956. Consolidated net earnings were $6,931,431 or $3.14 per share on the 2,168,426 common shares now outstanding against $5,726,072 or $2.61 per share on 2,146,391 shares outstanding on Sept. 30, 1956. This represents a 20.3% increase in consolidated net profit over the same period last year.

Pittsburgh Consolidation Coal Co. reports consolidated net income for the three months ended Sept. 30, 1957 of $6,052,260 or 66c a share, as compared with $4,761,339 or 52c a share for the same quarter of 1956. This includes the Pocahontas Fuel Co., Inc., acquired by Pittsburgh Consolidation Coal Co. Dec. 3, 1956.

CONTRACT CORE DRILLING

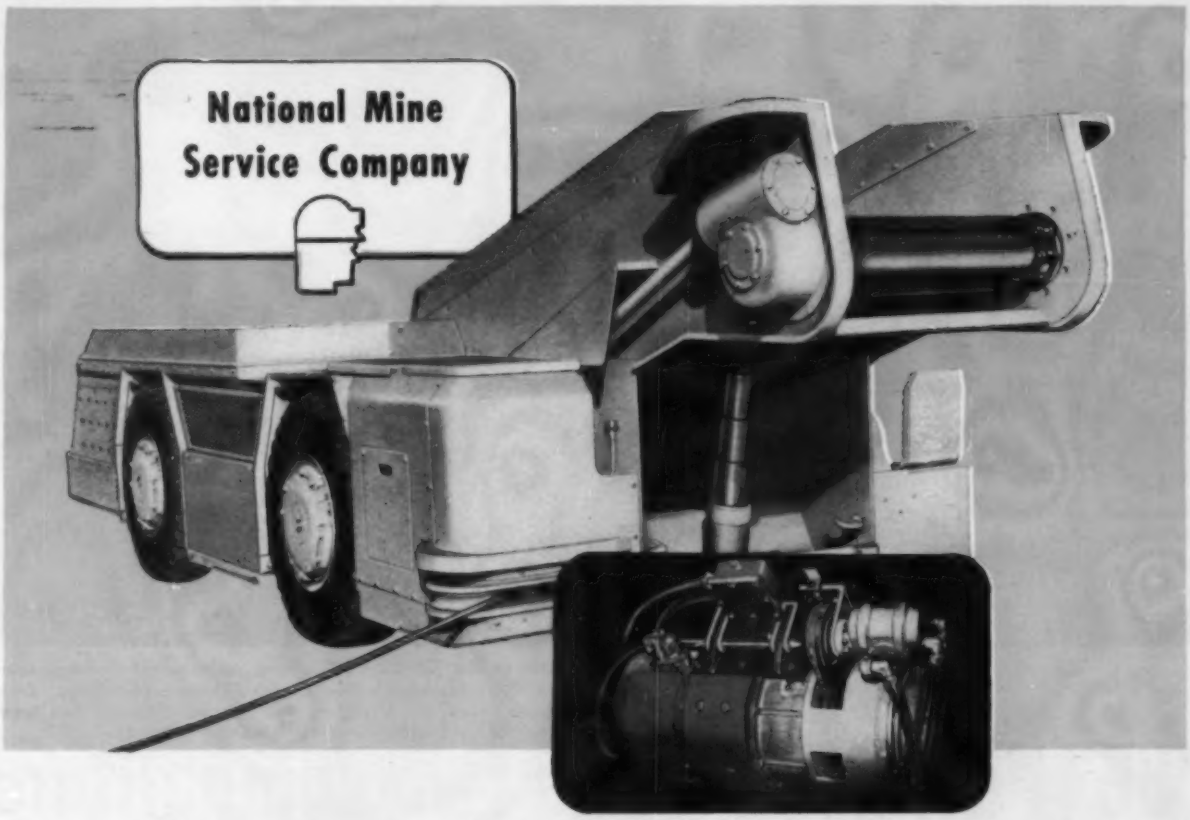
EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING • GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA



The single-motor design of the new National Mine TORKAR* A.C. or D.C. shuttle car is a major factor in reducing maintenance and operating costs

Electrical controls and wiring are greatly simplified because one, *single*, large capacity, non-reversing, A.C. or D.C. motor supplies all power for the new TorKar.

Driving through a torque converter, the motor operates at its most efficient speed, with less frequent starts and stops, and for much of the time under less than its full-load capacity. Ample opportunity is afforded for dissipation of heat. Power demand is less, and longer service life and lower maintenance cost are assured.

The torque converter absorbs and minimizes torsional shock of the drive line to the motor, and multiplies motor torque in varying amounts to meet demand. It also prevents the motor from being overloaded to the point where it might approach a stalled condition, thus inviting thermal damage.

Further reduction of load demand on the motor is accomplished by the constant-mesh, three-speed forward and reverse, patented transmission which makes it possible easily and quickly to select a gear ratio which will allow continuous movement of the car without jogging the motor or pulling its speed down to a point where it would operate inefficiently.

To learn in more detail how the TorKar can cut your maintenance and operating costs with these and other exclusive engineering and design features, write for literature or ask your National Mine representative to call.

*Trademark

U. S. Bureau of Mines Approved

National Mine Service Company

564 Alcoa Building • Pittsburgh 19, Pennsylvania

All-State Division, Logan, W. Va. · Anthracite Division, Forty Fort, Pa. · Ashland Division, Ashland, Ky. · Seneca Division, Beckley, W. Va. · Clarkson Division, Nashville, Ill.

Kentucky-Virginia Division, Jenkins, Ky. · Western Kentucky Division, Madisonville, Ky. · Whiteman Division, Indiana, Pa. · Mountaineer Division, Morgantown, W. Va.

Out of the pit with 18-tons of shovel-loaded limestone comes the "65" Payhauler owned by Lee Crawford Quarry Co., Cedar Rapids, Iowa. The 1,200-foot haul includes a 400-foot 15% grade. The "65" was chosen on competitive demonstration.

"65" Payhauler® beats two competitors on tough, 50-hour demonstration

—for Lee Crawford Quarry Co., Cedar Rapids, Iowa

Veteran quarryman Lee Crawford invited three makes of off-highway haulers to go into his pit and "roll up their sleeves." He wanted hauling that could match the crushing efficiency of his newly-equipped plant which is as nearly perfect as could be built.

One make of hauler could not match crusher capacity. Another kept the monkey wrenches busy. Winner of the 50-hour test: the International "65" Payhauler!

"Perfect Payhauler performance made our choice easy," states Plant Superintendent Kenneth Mercer. "The '65' hauled bigger loads easily up the 15% grade out of the pit. It dumped cleaner, and up to three times faster—and got away faster for shortest cycle time.

"With the '65', we have achieved our plant efficiency goal."

Try the exclusive high reverse and "zip-around" power steering—that give 18-ton "65" or 24-ton "95" regular pick-up truck spotting ease. Measure capacity-adding Payhauler get-away speed—and the fuel economy of its load-matched, turbo-charged diesel power. Measure super-fast Payhauler dumping speed. See your International Construction Equipment Distributor for a demonstration!

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

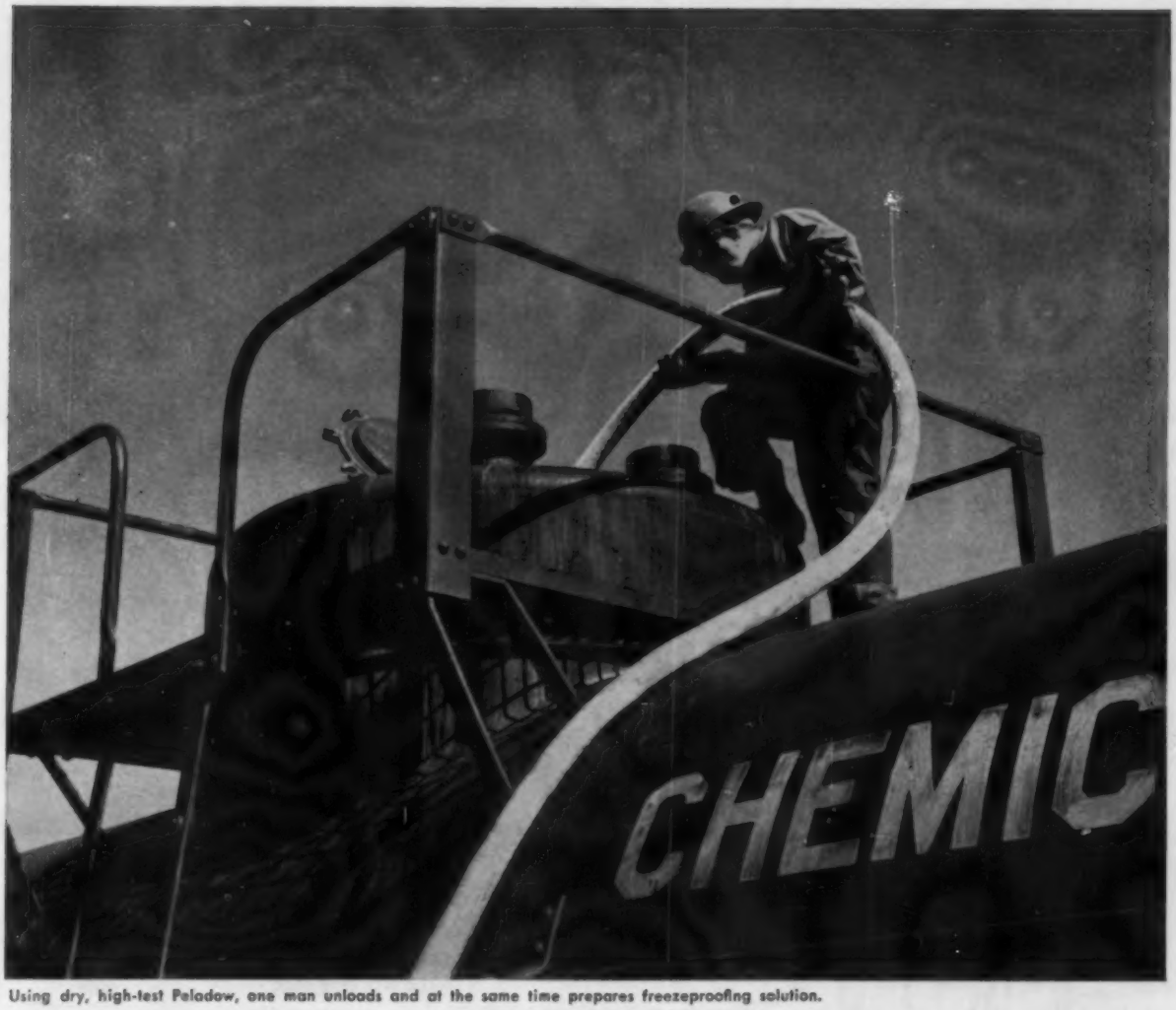
International Harvester Company
180 North Michigan Ave.
Chicago 1, Illinois

Gentlemen: Please send me a free copy of the new, fully-illustrated Payhauler catalog (Form CR-603-G).

Name_____

Street Address_____

City_____ State_____

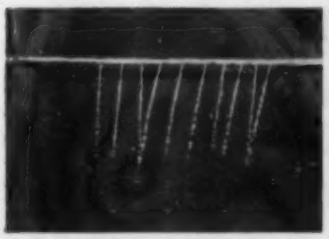


Using dry, high-test Peladow, one man unloads and at the same time prepares freezeproofing solution.

Freezeproof coal the modern way with Peladow . . . and save!

Improved method does away with the extra cost of shipping, handling and storing bags

Although packaged calcium chloride has long been in common use by coal mines, the development of Peladow® makes possible substantial savings in coal freezeproofing. A high-test, pelletized calcium chloride (94-97% concentration), bulk Peladow is shipped *dry* in tank-car quantities . . . can be unloaded, converted to a solution, and stored by *one* man.



After unloading, solution flow can be mechanically controlled to the spray boom.

Unloading begins by introducing water into the dome of the tank car of dry Peladow. Then, the resultant liquor is drawn off into tank storage where further circulation brings the solution to the right concentration. From tank storage, the solution is pumped to the spray booms which wet the coal as it is being loaded into cars.

Savings, reported by operators using this technique, quickly offset the cost of the necessary equipment. The cumbersome batch method of handling and storing bags is eliminated. Also, less material is required because 80 lb. of Peladow do the work of 100 lb. of ordinary-strength calcium chloride. Thus, you cut freight costs and gain the price advantage of bulk purchase.

For all the cost-cutting details on this advanced way of freezeproofing coal—contact our nearest sales office, or write us direct. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. CC 706X.

YOU CAN DEPEND ON DOW

A Day and Night Difference!

NEW Femco MINE-LITE* SYSTEMS

Now—Femco makes the finest fluorescent lighting systems for underground efficiency

SEE a day and night difference in working conditions! Here is portable area lighting ready now for men who mine.

SEE a day and night difference in design features! Famous Femco engineering has scored again with a superior product.

SEE a day and night difference in maintenance! Top up, old lamp out, new lamp in, no fuse to change. Sealed-in ballast is guaranteed.

Get the facts—ask for data

SAFE AND SURE Permissible systems have U. S. Bureau of Mines approval for gassy atmospheres up to the working face.

DESIGNED RIGHT Extra rugged lamp unit weighs only 12 lbs. Exclusive sealed-in Femco ballast is in the base for ease of standing.

EASY TO USE Systems are completely portable. Forty lamps use only 10 amperes. 230 Volt power source permits long cables.

Distributed by:

NATIONAL MINE SERVICE CO., 564 ALCOA BUILDING, PITTSBURGH 19, PA.

Division plants: Beckley, W. Va., Logan, W. Va., Morgantown, W.Va., Indiana, Pa., Forty Fort, Pa., Ashland, Ky., Jenkins, Ky., and Madisonville, Ky.

INDUSTRIAL PHYSICS & ELECTRONICS CO., SALT LAKE CITY, UTAH

MANUFACTURED BY

Femco, Inc.

IRWIN, PENNSYLVANIA

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Makers of the famous Femco Trolleyphone

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Consulting Mining Engineer
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Profitable Mine Operation—

calls for operating efficiency all along the line. These specialists in various phases of mine operation can aid you materially in determining quick, economical solutions to your mining problems that make for more efficient operations, resulting in lower costs and a consequent greater return on your investment. Consult them!

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$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED undisplayed advertising rate is one-half of the above rate payable in advance.
BOX NUMBERS count as 1 line additional.

INFORMATION:
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals). EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style. AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches to a page.

DISPLAYED RATE:
The advertising rate is $12.50 per inch for Equipment and Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

EMPLOYMENT OPPORTUNITIES—$21.00 per inch, subject to agency commission.

Send New Advertisements or Inquiries to Classified Advertising Div. of Coal Age, P. O. Box 12, New York 36, for December issue closing Nov. 15

FUELS ENGINEERS WANTED

Tennessee Valley Authority has vacancies for Fuels Engineers with experience or training in production and transportation economics of coal. The work involves obtaining information on coal reserves; their recoverability, cost of production and surface transportation; and appraising coal suppliers' estimates and bid data regarding quality of coal, rate of production, and cost factors affecting price escalation. Salaries range from $5200 to $8900. A degree in mining, civil, or mechanical engineering from an accredited college or university is required. Positions at higher levels also require progressive experience in coal mining (engineering and/or production). The top position is a section supervisor. Retirement benefits, annual and sick leave, 40-hour week. Location is Chattanooga, Tennessee.

Interested candidates should write to Tennessee Valley Authority, Examining Section, Knoxville, Tennessee.

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LOCOMOTIVES

1½ to 10 Tons 18" to 56½" Track Gauge.
GREENSBURG MACHINE CO.
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New and Used Mining Equipment
Crushers, feeders, conveyors, tipples, locomotives, mining machines & fans.
The Industrial Machine & Electric Company
T. E. Davies, Owner
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Phone 3764

FOR SALE
111 M Marion High Lift Front End with 3½ yard dipper, complete with new Creed Chains and Fawick Clutch, good condition. Located in Southern West Virginia. Phone Man, West Virginia 9229 or New Port Richey, Florida, 4212.
Bailey Production Corporation

Buying
Good USED Equipment
is frequently the difference between having needed equipment or doing without it.

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STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF

COAL AGE published monthly with add'l issue Mid-July at Philadelphia, Pa. for October 1, 1957.

1. The names and addresses of the publisher, editor, managing editor and business manager are: Published by McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N.Y.; Editor Ivan A. Given, 330 West 42nd Street, New York 36, N.Y.; Managing editor, Harold Davis, 330 West 42nd Street, New York 36, N.Y.; Business manager, Raymond H. Smalley, 330 West 42nd Street, New York 36, N.Y.

2. The owner is McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York 36, N.Y. Stockholders holding 1% or more of stock are Donald C. McGraw & Willard T. Chevalier, Trustees under Indenture of Trust m/b James H. McGraw, dated 1/14/21 as modified; Donald C. McGraw & Harold W. McGraw, Trustees under an Indenture of Trust m/b James H. McGraw, dated 7/1/37 as amended; Donald C. McGraw, individually; Harold W. McGraw, individually; Elisabeth M. Webster, c/o Donald C. McGraw (all of 330 West 42nd St., New York 36, N.Y.); Mildred W. McGraw, Madison, New Jersey; Grace W. Mebren, 536 Arenas St., La Jolla, Calif.; Genoy & Co., P.O. Box 491, Church St. Station, New York, N.Y.; Touchstone & Co., c/o Wellington Fund, Inc., Claymont, Delaware.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

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McGRAW-HILL PUBLISHING COMPANY, INC.
By John J. Cooke, Secretary

Sworn to and subscribed before me this 3rd day of September, 1957.
[SEAL]
JANET A. HARTWICK
(My commission expires March 30, 1959)

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for the Coal Industry
HELMICK & ASSOCIATES
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Gateway tract to large area of #5 Ohio Deep Mine Coal.
This tract lies within easy trucking range of Canton, Akron, Cleveland, Alliance and Youngstown Area.
Located on State Highway, Nickel Plate Railroad.
Ohio Power installed, shaft sites grouted and shaft in progress.
Adequate water, area for settling tanks, storage etc. and within one (1) mile of coal pipe line and major gas transmission lines.
Very large additional territory available.
Harold E. Wynn
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CONVEYOR BELT
520 ft. 48" x 7 ply, Used Conveyor Belt—Excellent condition. No holes—No edge wear.
Price ..... $8.00 per foot.
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2—14BU 7RBE Joy Loaders (W&C)
1—14BU 7CE Joy Loaders (W)
3—14 BU 3PE Joy Loaders (W&C)
3—12BU 9E & 7E Joy Loaders Rebuilt & Reconditioned (C&W)
2—8BU 500 Volt DC (C)
2—8BU 250 Volt DC (C&W)
2—Myers Whaley, #3 Loaders (W)
2—6SC Joy Shuttle Cars (C)
3—10SD Joy Shuttle Cars, Modern (C)
4—32D Joy Shuttle Cars (C)
1—32D Joy Shuttle Car, Rebuilt (W)
2—32E7 Joy Shuttle Cars (W)
4—32E10 Joy Cars—Rebuilt (W)
1—32E16 Joy Shuttle Car (C)
1—29U Jeffrey, Rubber Mtd. (C)
1—PL11—7PE Joy Elevator (C)
1—PL11—8PE Joy Elevator (C)
2—40 H. P., Acme Self Propelled Air Compressors-Permissible (W)
1—360 Goodman Loader (C)
2—Baker-Rauland Battery Tractors (W)
1—RBD Chicago Pneumatic Roof Bolting Machine (W)

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1—36" Barber Green Belt 2600' Centers (W)
2—MTB 30" Joy, 40 H. P., Permissible Tandem Drives, w/3000' of MTB Structure & 6000' of Goodyear Coal Flo Belting (C)
5000'—30" Conveyor Belting, Good Condition (W)
1—26" Jeffrey 52B 1000' Centers (W)
4—26" Hewitt Robbins & Joy Drives & Sections (C&W)
2—24" Goodman Belt, 500' Long (W)
4—20" Joy Chain Conveyors, permissible, 300' each (W)
4—15" Joy Chain Conveyors, permissible (W)
30—61AM, 61EW, 61HG & 61W Jeffrey Chain Conveyors (C&W)
6—G12½, G15, & G20 Goodman Shakers, AC & DC (C&W)
1—PT12 Long Piggyback Conv. (W)
32—Goodman Power Duckbills, Model 477, G12½ (W)

CUTTING MACHINES

4—7AU Track Mtd. Sullivans (C&W)
3—7B Sullivans (W)
12—11B Sullivans, 35 & 50 H. P. (W)
8—12AB&12AA Standard Goodman (C&W)
3—12AA Universal Goodmans (W)
3—212AA Baby Goodmans 250 V. (W&C)
2—212G3 Baby Goodmans, 220/440 (W)
9—512 Goodmans, 2—w/Bugdusters, 8½' Bars (W)
2—712 Goodmans (C)
1—624 Goodman, 42" T. G. (C)
1—28C Jeffrey Arc Wall (W)
1—29U Jeffrey, 220/440, V. 42" T. G.—Excellent (C)
1—29UR Jeffrey, Rubber Mtd. (C)
6—35BB Jeffrey Coal Cutter w/Bugdusters—Excellent Condition (C)
25—35B & 35BB Jeffreys as is or Rebuilt, w/Stub axle trucks (C&W)
1—Lot Machine Trunks for Jeffrey & Goodman (C)

LOCOMOTIVES

1—8 Ton Goodman (W)
2—4 Ton Ironton 25" High (W)
2—4 Ton HM825 G. E. (C)
5—4 Ton Goodmans (W&C)
4—4 Ton MH96 Jeffreys (W&C)
1—4 Ton MH121 Jeffrey (W)
1—4 Ton MH12 Jeffrey (C)
1—5 Ton HM80I G. E. (W)
12—6 Ton MH88 Jeffreys (W)
10—6 Ton HM803, G. E. 30", 42", or 44" T. G. (W)
8—6 Ton HM823 G. E. (W)
2—6 Ton HM834 G. E. (W)
1—6 Ton HM835 G. E., 25" Ht. (W)
1—6 Ton G. E., Battery—All New (W)
3—6 Ton 3314T Goodmans (C&W)
3—8 Ton MH100 Jeffreys (C&W)
1—8 Ton HM819 G. E. 48" T. G. (W)
1—8 Ton HM821 AGE (W)
1—8 Ton Goodman 36" T. G. (W)
2—10 Ton HM822A G. E. (W)
3—10 Ton Goodmans (W)
3—13 Ton Jeffreys MH110 (C&W)
1—13 Ton Goodman (W)
1—13 Ton HM 800 G. E. (W)
Trucks, Gears & Armature for Most of These Locos. (W)

MINE CARS

39—36" T. G. Drop Bottoms (W)
233—42" T. G. End Dumps, Various Sizes (W)
33—44" T. G. Drop Bottoms, 10 Ton (W)
174—44" T. G. Drop Bottoms, Various Sizes (W)
505—44" T. G. End Dumps, Various Sizes & Makes. (W)
80—48" T. G., S. D. Drop Bottom (W)

SUBSTATIONS & TRANSFORMERS

1—100KW Int. Diesel Generator Set. (C)
1—100KW MG Set, 220/440 Volt (C)
1—75KW Diesel Generator Set (W)
1—150KW Rotary Converter 2300/4000 Volt (W)
1—150KW Rotary, Completely Automatic (W)
1—150KW Reliance MG Set, 2300/4000 Volt (C)
1—150KW Rotary Armature (W)
1—200KW Rotary Armature (W)
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1—42"x36" Jeffrey Flextooth Crusher (C)
1—36"x36" Jeffrey Double Roll Crusher (W)
1—24"x30" Double Roll Crusher (C)
1—5' Morrow Shaker (C)
1—30"x30" Double Chain Conv. (W)

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3—Trolley Phones (W)
30—Hoist, From 5 to 300 H.P. All Types (W)
5—Miles Copper Transmission Line (W)
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2—Sets Railroad Track Scales (W)
1—Crossover Dump (W)
6—Jeffrey A6 Coal Drills (C)
1—Armco Prefab Steel Bldg., 130' Long & 12' Wide (W)
1—D4 Caterpillar Dozer (C)
1—D7 Caterpillar Dozer (W)
1—MSA Bantam Duster (W)
3—American Mine Door Rock Dusters (D&W)
1—30 H.P. MSA Rock Duster, Permissible (C)
1—ITE Auto. Circuit Breaker (C)
6—31, 24J & 28J Joy Motors (C&W)
14—Battery Chargers (C&W)
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1—7 ton Atlas—36" ga.
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2—6 ton Jeffrey, 18" gauge
1—6 ton Goodman, 18" gauge
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1—Joy 14BU Loader, high pedestal, 7DE.
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1—Joy 20BU Loader, latest type.
1—Joy 11BU Loader, latest type.
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3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" ga.
1—G. E. 4 ton, type 825 Locomotive, 22" high.
10—G. E. 6 ton, types 801, 805, 821 Locomotives, 42", 44" and 48" gauge.
1—G. E. 8 ton, type 822 Locomotive, 44" gauge.
3—G. E. 10 ton, type 809, 42", 44" & 48" gauge.
1—Goodman 4 ton, 8-30 Locomotive, 22" above rail.
2—Goodman type 33, 6 ton, 44" and 48" gauge.
3—Goodman, 8 ton, type 32A, 36", 44" & 48" ga.
3—Westinghouse, type 902, 4 ton, 44" & 48" ga.
2—Westinghouse, type 904, 6 ton, 44" & 48" ga.
2—Westinghouse, type 906, 44" and 48" gauge.
2—Westinghouse, type 907, 10 ton, 44" & 48" ga.
2—Diesel Locomotives, 8 and 10 tons, excellent.

TIPPLE EQUIPMENT

1—Cedar Rapids portable super Screening Plant.
1—Allis Chalmers 5' x 14' Ripple Vibrator.
1—5' x 14' Robins double deck Vibrator.
1—4' x 10' Robins Gyrex Vibrator.
1—McNally Pittsburg all steel tipple, four track, perfect.
1—Complete five trunk tipple, all steel, with two compartment Jeffrey Washer.
1—Menzies tandem Hydro-Separator.
Bolt Loading Booms.
1—Robins Car Shakeouts.
10—Crushers, various sizes.
Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES

2—Jeffrey 70 URB Cutters, rubber tired, universal head, low vein.
4—Jeffrey 29UC Universal Machines on cats.
2—Joy rubber tired 11RU Cutters with Bugdusters.
1—Goodman on cats, 31" overall height.
1—Baby Goodman 212, rebuilt, 250 volt DC.
1—Baby Goodman, 212, rebuilt, 220 volt, 3 ph. AC.
1—Goodman 312, 18" high, 2—Goodman 512's with bugdusters, like new.
4—Goodman 512's rebuilt, or as removed.
2—Joy 11B Cutting Machines, rebuilt.
2—Goodman 512 Cutting Machines, 220 volt AC.
6—Goodman 12AA's and 112AA's.
2—Goodman 324 Stabbers.
2—Goodman 724 Stabbers.
15—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's, on low vein trucks.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on truck.
2—Jeffrey 29C's, truck mounted.
1—Jeffrey 29L on truck, perfect.
2—Sullivan CR-10's, 15" high.

LOADING MACHINES

2—Jeffrey 61 CLR's on rubber, 26".
14—Joy Loaders, all types.
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
2—Clarkson Loaders, 28" above rail.

CONVEYORS

2—Jeffrey 52-B, 30" Conveyors 1500' each. Excellent.
4—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
1—Barber Greene 30" Belt Conveyor; 100'. Excellent
1—Robins 30" Belt Conveyor, 1000'.
2—Jeffrey 52-B, 28" Conveyors, 1200' each.
3000' Conveyor Belt, 30".
2—81EW Elevating Conveyors.
2—81WH 15" Room Conveyors, 300'.
4—Joy Loader UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
3—Long 400 DBH 18" Chain Conveyors, 25 H. P. motors. New.

CONVERTERS AND DIESEL PLANTS

1—50KW G. E. TC-6, 275 volt Rotary Convertor.
2—100KW, G. E. TCC-6's, 275 volt, Rotary Conv.
1—150KW, G. E. HCC-6, 275 volt Rotary Conv.
1—150KW, 6 phase, Allis-Chalmers, Rotary Converter, 275 volt DC, perfect.
1—200KW, G. E. HCC-6 Rotary Conv., 275 volt DC.
3—300KW, G. E. HCC-6 Rotary Converters, 275 DC.
3—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
1—375KW Westinghouse Rotary Converter, 275 volt.
2—500KW West. Rotary Converters, 275 volt DC.
1—200KW Westinghouse Rotary Converter, 275 DC.
1—250KW Allis-Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
(All the above with 6900/13800 and/or 2300/4000 primary transformers)
2—150KW MG Sets, Gen. Elec. and Westinghouse.
1—200KW MG Set Westinghouse, rebuilt.
1—200KW MG Set, General Electric, perfect.
2—150KW Allis-Chalmers MG Sets, 275 DC volt, auto test 220-440 AC volt.
1—300KW Westinghouse, 600 volt, MG Set, rebuilt.
2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converter.
1—500KW HCC-6 Rotary Conv., 6 ph., 600 volt DC.
1—Cummins 125KW Diesel, 250 volt DC Generator.
1—G. M. C. Diesel Plant with 66KW Generator 275 volt DC.
1—D-15,000 Caterpillar Diesel with 75KW generator, 275 volt DC.
1—Allis-Chalmers Natural Gas Engine with 100KW Generator, 275 volt DC.
1—700 H. P. Shaft Hoist, complete.
Complete steam plant, will sell all or any part.
Boilers, like new, 1100 H. P. and 500 H. P. Also transformers, turbines, etc.
3—Complete Tipples with Cleaning Plants. "2 all steel."

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Battery Supply Tractors, rubber tired.
10—Air Compressors, 1 H. P. to 40 H. P.
40 Mine Pumps, all types.
2—Barber-Greene self-propelled Bucket Elevators.
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30 Mine Cars, drop bottom, 44" gauge.
30 Mine Cars, 48" gauge, Drop Bottom 20" above rail.
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90 Mine Cars, end dump, 20" high, 48" gauge.
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Downgrades vary from 0 to 11% . . . average 5% on the 8 and 11 mile hauls. The short, easy shifts provided by the Fuller Transmission, and the automatic braking feature of the torque converter, permit easy handling of the loaded (97,000 lbs.) trucks. Speeds are held downgrade to 25 mph *without* use of regular service brakes (a Reynolds' stipulation.)

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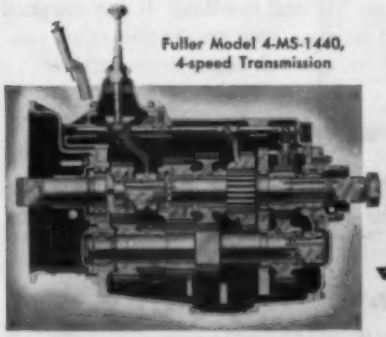
One of Reynolds' 14 new Model 25SL 25-ton Dart Trucks. Twin Disc Torque Converters are matched with Fuller 4-MS-1440 Transmissions.



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really *where horsepower goes to work*

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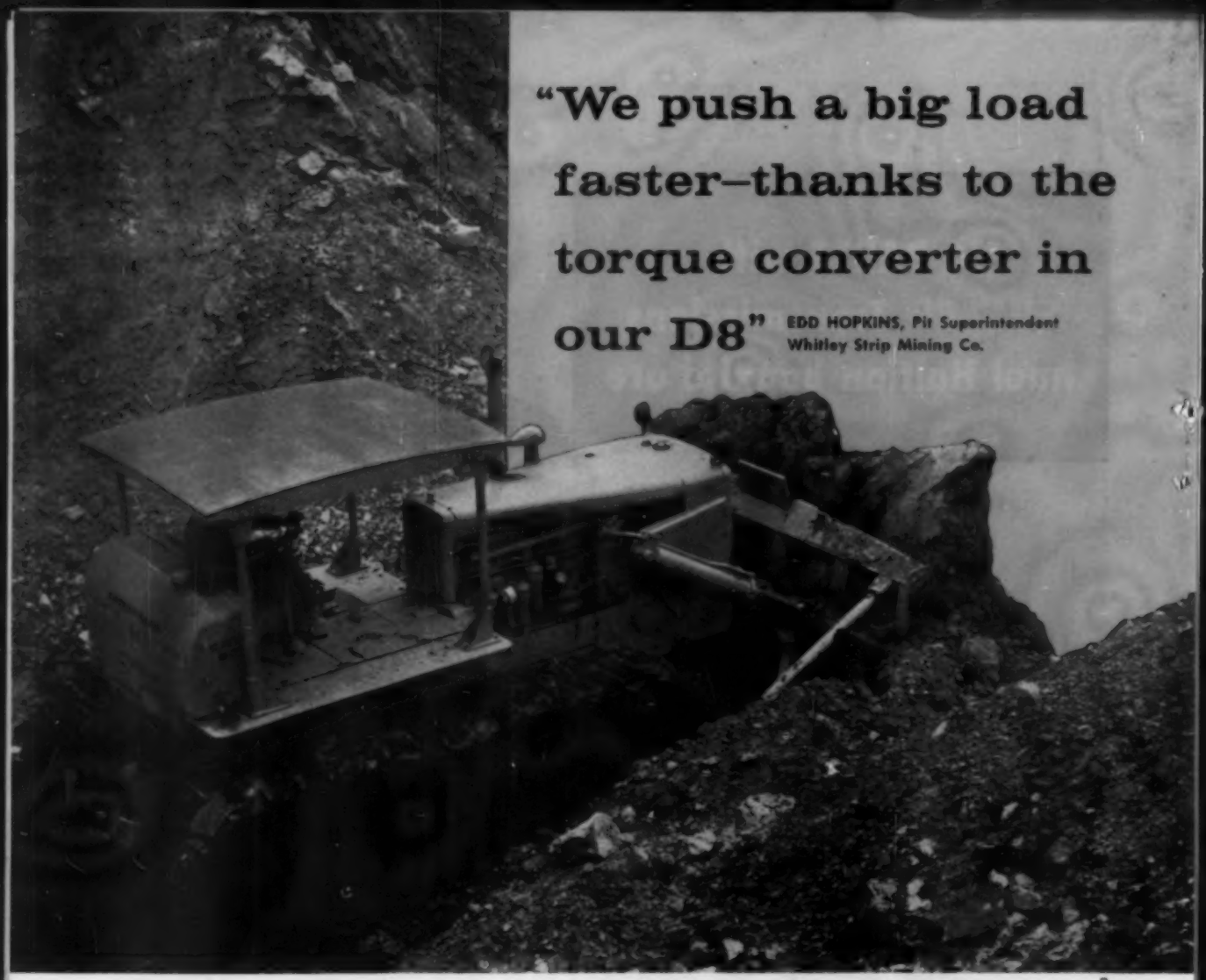

"We push a big load faster–thanks to the torque converter in our D8"

EDD HOPKINS, Pit Superintendent
Whitley Strip Mining Co.

When you buy a powerful CAT* D8 Tractor, you have a choice of direct drive with oil clutch or torque converter drive. Whitley Strip Mining Co., Williamsburg, Ky., decided on the torque converter.

"We really like it," says Edd Hopkins, pit superintendent. "We push a big load faster—thanks to the torque converter in our D8. Since we use this machine for stripping, it speeds our work and gives us bigger production. As it digs into the overburden, engine speed automatically adjusts to the load."

Overburden, which is mostly sandy clay, runs approximately 45 feet deep. Present mine production is 400 to 500 tons of coal daily. The D8 also is used for leveling spoil bank.

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Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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THE HARD WORK

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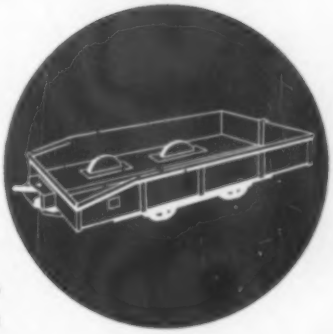
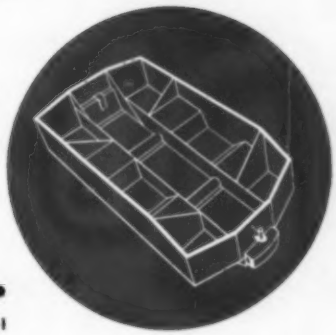
4 wheel or 8 wheel



END DUMP
4 wheel



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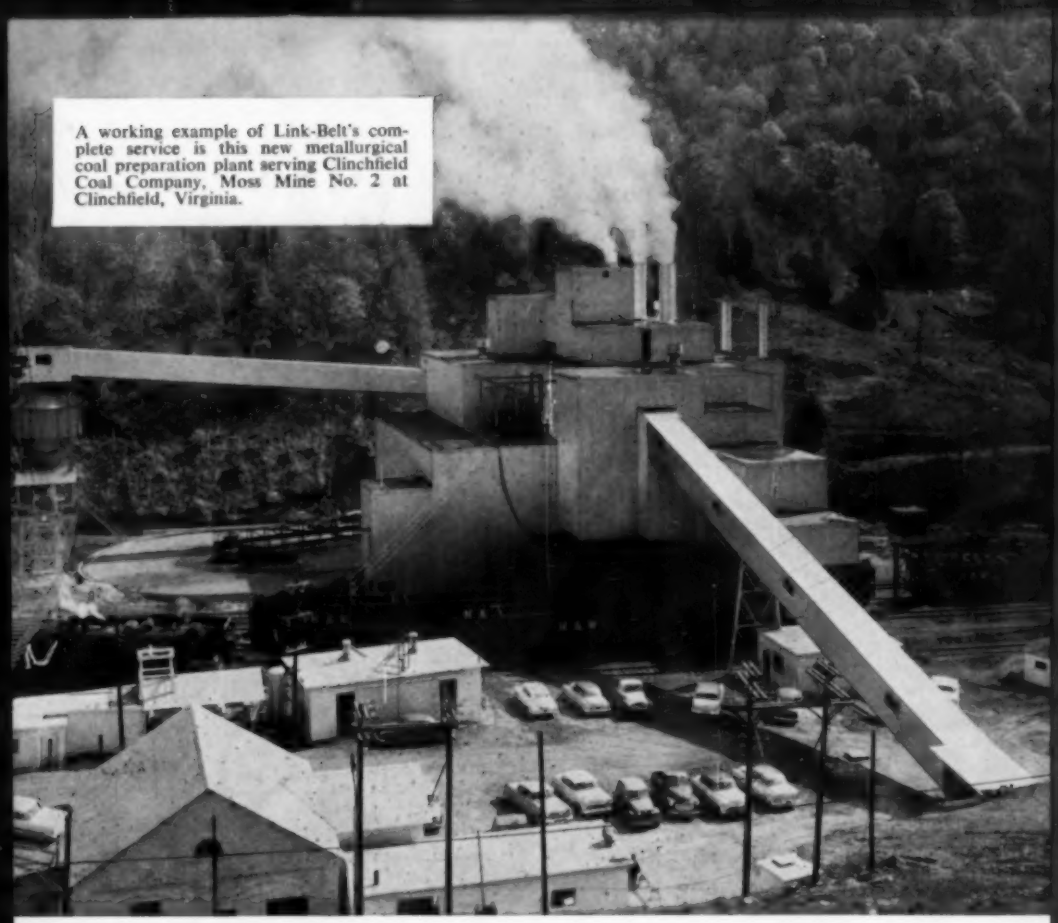

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for modern coal preparation

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